NATIONAL PUBLICATION FOR BUYING-USING-SELLING COMPUTER HARDWARE & SOFTWARE

JANUARY 1986
VOL. 6 NO. 1
ISSUE 72
$2.25
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COMPUTER SHOPPER™

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PAPER 126

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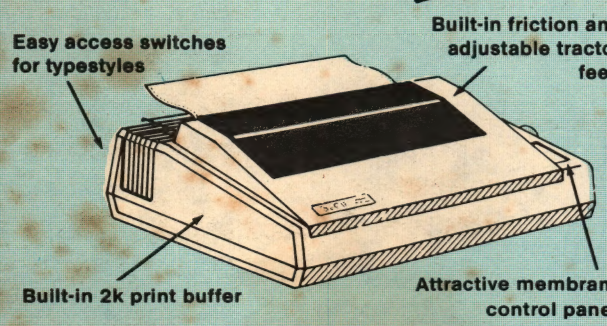
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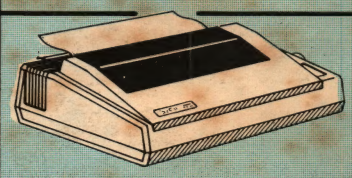
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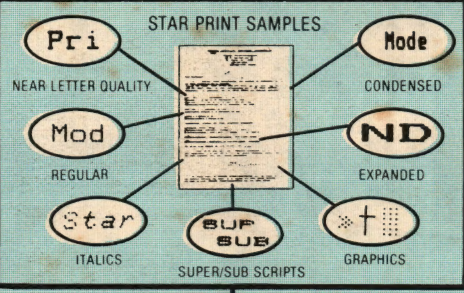


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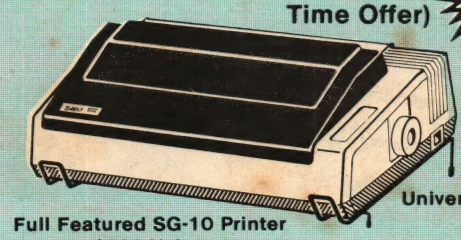


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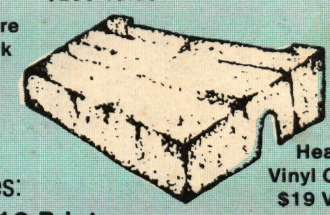


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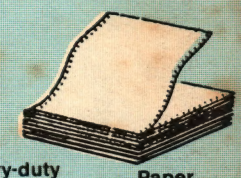
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Computer Shopper is published monthly for $18 per year by Computer Shopper, Inc., 407 S. Washington Ave., Titusville, FL 32796. Application to mail at Second-Class Postage Rates is pending at Titusville, FL and additional mailing offices. POSTMASTER: Send address changes to COMPUTER SHOPPER, P.O. Box 1419, Titusville, FL 32781.

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407 S. Washington Ave., P.O. Box F ● Titusville, FL 32781
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Source ID No.: TCS575 ● Compuserve No. 70275,1023

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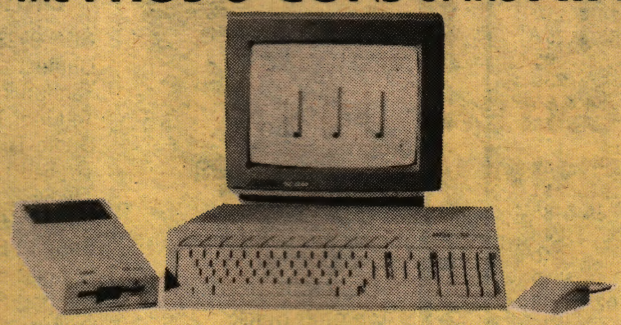
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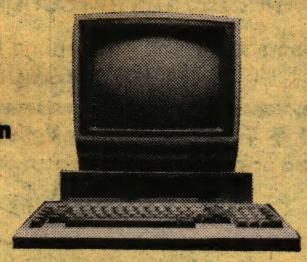
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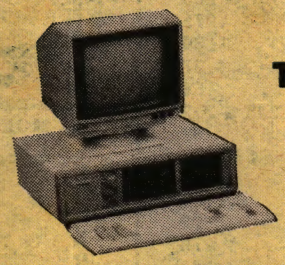
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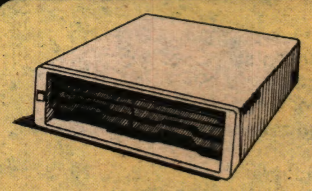
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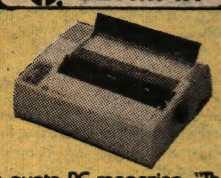


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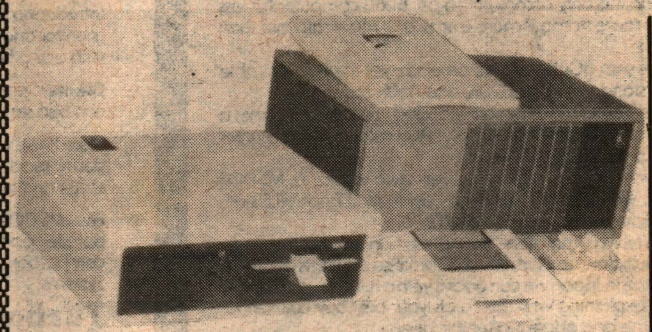
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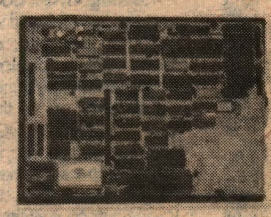
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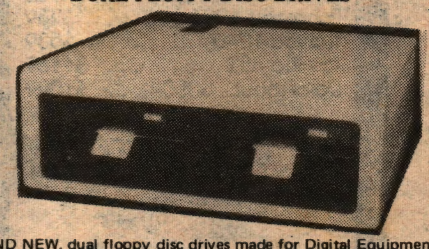
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Epson Equity Series Offers Full Range of PC Compatibility

by Rich Fields

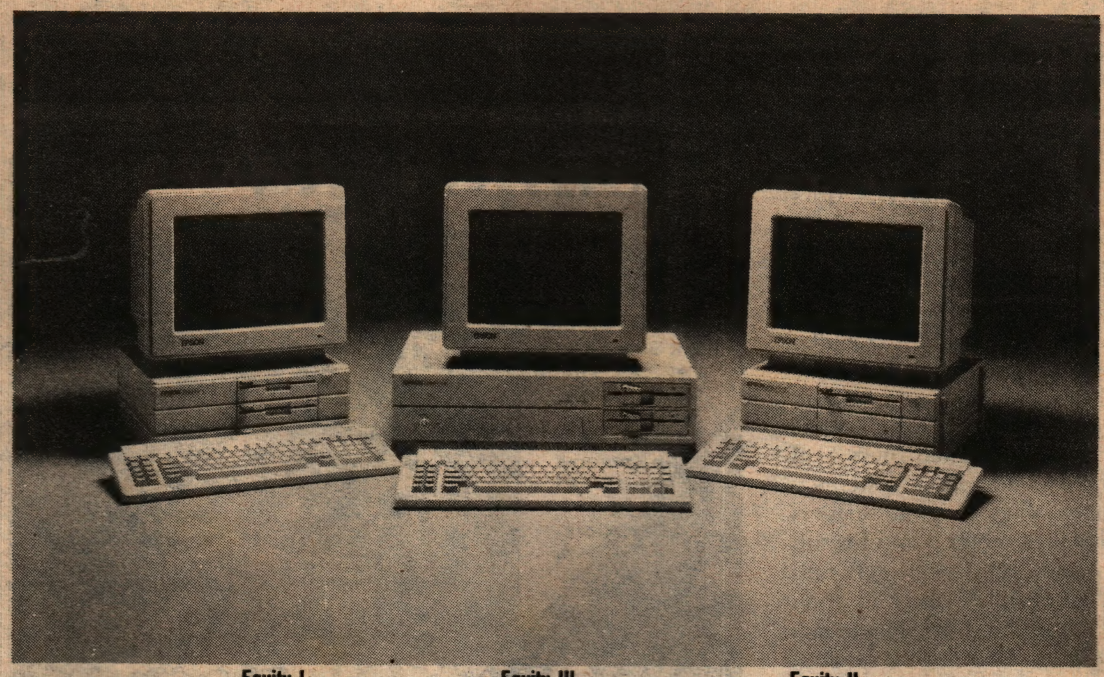
Epson has made its mark in the personal computer business for innovative products built with quality and sold at low prices. The Epson line of printers has become the standard for dot matrix, impact, personal computer printers and their new lines of daisy wheel printers is becoming very popular.

When Epson entered the personal computer sector of the industry it introduced products that were not only innovative but unique in operation. While this may be a virtue in the peripheral market it has proved to be less than a success in the computer field. The first Epson Computer to reach the market was the HX-20 Portable, which was the first portable with a full sized keyboard and built-in cassette drive for the storage of data. Its only drawback was the display which consisted of four lines of 20 characters. In spite of this the Epson Portable seemed to be headed for a successful debut since there seemed to be a demand for such a lap portable.

Unfortunately, the introduction of the Tandy TRS-80 Model 100 with its eight lines of 80 characters, 32K of RAM, built-in modem and on-board software completely obsoleted the Epson Portable before it ever got into the stores.

The next Epson computer introduction was the Epson QX-10 a computer designed to be used by people with no computer background. This machine had two disk drives, plent of memory and excellent video display including graphics. It operated with the VALDOCS system designed to make the computer useful to anyone with a minimum of effort. The QX-10 had a special keyboard called the HASCI designed to provide single keypress operation of functions that required multiple keystrokes on any other system. The combination of Valdocs and the HASCI keyboard seemed the answer to the prayer of many people who wanted to use a personal computer without the problem of learning a lot about computers.

The promise of the QX-10 and Valdocs was never met because there were many bugs in the first releases of Valdocs and sales of the system slowed until the bugs were fixed. Finally when Version 1.19 of the software was operational the system seemed to work as promised, except that it was painfully slow. It was then promised that when Version II of Valdocs was released, it would do everything it was supposed to do and it would run with great speed. Version II was always just around the corner but never quite ready for release. Meanwhile Epson added CP/M to the QX-10 and provided application software to run under that standard DOS. The QX-10 was a fine computer system that never quite made it because while all its problems were being fixed, IBM came out with the PC and MSDOS became the de facto standard.



Equity I Equity III Equity II

Valdocs II was finally released but by then it only had the effect of improving the QX-10 and making life easier for its owners. MSDOS software for the 16-bit, large memory PCs had progressed far beyond the capabilities of any 8-bit computer.

In an effort to get into the MSDOS field, Epson introduced the QX-16 an 8088 based 16-bit computer. However, again Epson went its unique way in computer design. The QX-16 is not IBM PC compatible. It requires special versions of MSDOS software and it cannot use the IBM compatible plug-in boards available from hundreds of vendors.

Now Epson has come back into the personal computer market with three complete lines of IBM compatible computers designated as the Equity Series. Equity I is completely compatible with the IBM PC computers and sells at a much lower price and has additional features.

There are three configurations of the Equity I computer. All three have a small footprint CPU unit including an 8088 CPU, 256Kbytes RAM, detachable keyboard, Centronics parallel printer port, RS-232C serial port, MSDOS operating system including GWBASIC and complete documentation. Configuration A includes a single 360KB floppy disk drive and sells for a suggested retail price of $995. Configuration B has two 360 KB floppy disk drive and sells for $1,295. Configuration C has a single 360KB floppy disk drive and includes a 20MByte internal hard disk drive.

Epson has provided a full line of components and peripherals for the Equity I computer these include:

- Epson Monochrome Video Card which lists for $129.
- Epson 12" Monochrome Video Monitor listing for $149.
- Epson Color/Graphics Video Card for $149.
- Epson 13" RGB Color Monitor which is $549.
- Epson 256KB Memory Expansion Card which lists for $169.

The A and B Configurations can be expanded by the addition of the following disk drives:

- Epson 360KB floppy disk drive for internal mounting is $299.
- the Epson 20MByte hard disk with controller lists for $1,195.

The Equity I series was introduced at Comdex 1985 and should be on sale at Epson America's dealers when this appears.

Epson Equity II Series Of PC-XT Compatible Computers

With the decision to produce IBM compatible computers, Epson did not stop at PC compatibility which is now their basic low cost model, but has also introduced the Equity II, a high performance, low cost 16-bit system that is compatible with the IBM XT at a much lower price.

The Equity II series is driven by the NEC V30 microprocessor. This chip is compatible with the 8086 intel processor but offers dual speed operation. A user can switch between the normal 4.77 MHz speed and 7.16 MHz clock speeds available with the Equity II. The CPU has a 20-bit address and a 16-bit data bus. Optional support for a 8087 coprocessor is provided.

The Equity II series comes with 640KB RAM on the main board plus both a parallel and serial port. The floppy disk controller is also located on the main board and therefore does not use any of the five, full size PC compatible slots. The main board also contains a socket for an 8087 coprocessor, a real-time clock/calendar with battery back-up and a built-in display controller. This display controller supports both an IBM PC-compatible monochrome text and Hercules graphics (720 x 348 dot), RGB Color and graphics (640 x 200 dot), or Composite Video Monitors.

The Equity II comes in two disk configurations, customers can order a computer with a single 360KB floppy disk drive, or with a floppy drive and a 20 Mbyte hard drive. The single floppy drive can be upgraded by adding either a second 360KB floppy, a 1.2 Mbyte floppy, or a 20 Mbyte hard disk.

The Equity II keyboard is an IBM AT type with 83 keys including qwerty, function and numerical pad keys.

Epson has provided a complete range of components and peripherals for the Equity II including both color and monochrome monitors and a mouse interface board. These are the same as those described under the Equity I.

The Equity II Series prices will start at less than $1,900 for the basic one driven system. At the time this is being written the complete range of prices is not available.

Epson Equity III Series Computers

In line with its new policy of producing a complete IBM-compatible line of computers, Epson is introducing the Equity III Series which is compatible with the IBM AT. The base configuration for the Equity III will retail for less than $3,500, a comparable IBM AT lists for $5,450.

The Equity III is powered by a 80286, 16-bit microprocessor and support for the 80287 coprocessor is provided. The 80286 runs at a clock speed of 6 MHz and the Equity III has two modes of operation, it can operate as a single user computer (8086 compatible), or as a multi-user processor.

Equity III has eight IBM-compatible slots. Six with a 16-bit bus and two with an 8-bit bus. In its base configuration the Equity III comes with 640 Kbytes of RAM but the systems 24-bit address bus will accommodate as much as 15.5 Mbyte of expanded memory.

The base configuration Equity III comes with a single, half height, 1.2 Mbyte floppy disk. A second configuration adds a half height 20 Mbytes hard disk drive. The basic configuration includes both the floppy and hard disk controllers. Additional hard or floppy disk drives can be added up to a maximum of four drives.

Both serial and parallel ports are included on the main board as is a clock/calendar with a battery back-up. The same video options are available as for Equity II including both monochrome, RGB Color and Composite color.

The detachable keyboard is compatible with the IBM AT. A typical Equity III configuration including 640KB of RAM, 1.2 Mbytes floppy drive and a color monitor will retail for less than $4,200 including MSDOS and GWBASIC.

Delivery of the Equity III will begin in February 1986 and it will be available from Epson dealers.

For information contact Epson America, Computer Products Division, 2780 Lomita Blvd., Torrance, CA 90505, (213) 539-9140. ●

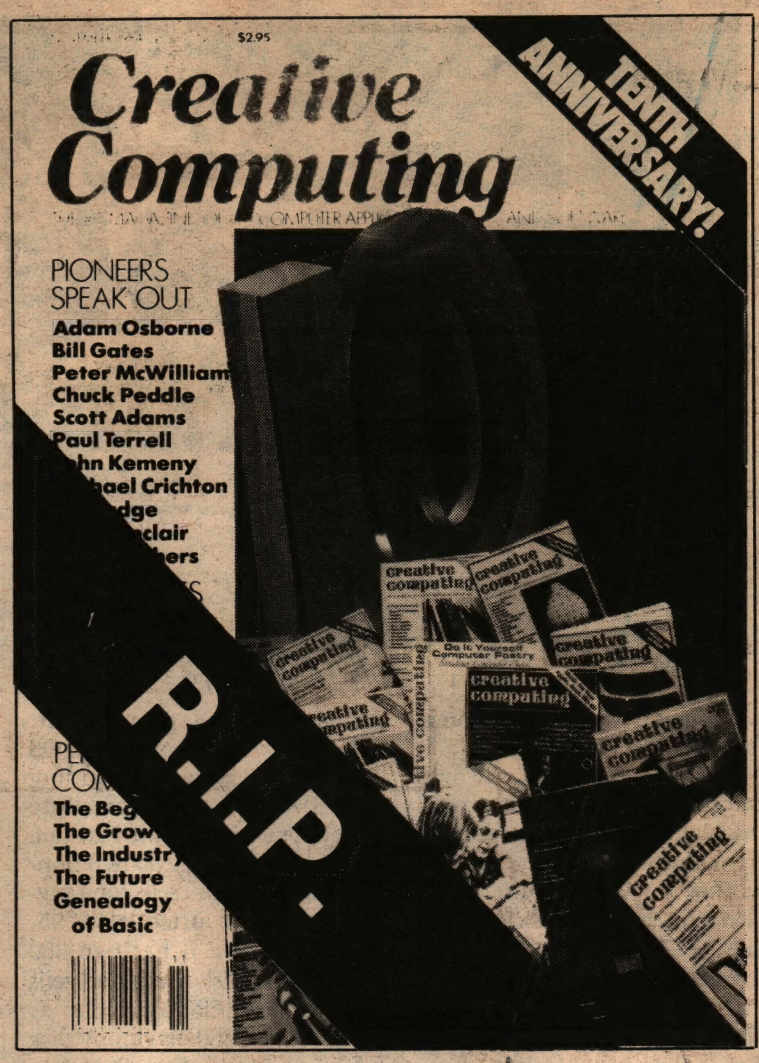
Stan Veit's History *Creative Computing* Magazine

I have a slim, bound volume that has just become a rare collector's edition. It is my autographed copy of the Tenth Anniversary Edition of *Creative Computing Magazine* with my name inscribed in gold on the cover (and spelled incorrectly!). Now this would be a rare collector's item in any event but it is now even more precious because *Creative Computing Magazine* has been killed, another victim of the terrible shrinking disease at Ziff Davis. The death of my second favorite magazine was almost certain, once ZD heaped the subscription fulfillment obligations from *Computers & Electronics* on it and raised the ad rates beyond the ability of *Creative's* advertisers to pay.

Incidentally, although the title of this article is "Stan Veit's History," some of the historical material has been obtained from an article in the 10th anniversary issue of *Creative Computing* by John Anderson.

The history of *Creative Computing*, which was the first computer hobbyist publication, starts back in the early 1970s when David Ahl was employed at Digital Equipment Corp. to market PDP-8 Computers to educational institutions. He realized that the schools needed massive support if they were to be able to use the computers DEC was selling. To that end he provided a package of applications and started a newsletter called *Edu*. This became a runaway success and gave him the idea that a educational computer magazine nof connected with any manufacturer would also be a success. Later David left DEC and went to work for AT&T as Education Marketing Manager. In his spare time he made plans to publish *Creative Computing* and by October 1974 he got out the first issue. Although he had only 600 subscribers, he printed 8,000 copies and mailed them to libraries and school systems in hopes of gaining subscribers. This idea worked and his subscription list grew slowly until by August 1975 he had about 2,500 circulation. David and *Creative Computing* survived because David kept his job and no one else got paid. The love of computing and the need of schools for computer information kept the magazine alive and growing.

Remember, this was before the first microcomputer had appeared and the contents were directed to those schools who had minicomputers. The articles were contributed mainly by the readers who were willing to share their programs with others. Today this outpouring of mutual aid among computerists is called "The Hackers Ethic" but then it was just common sense to increase the store of applications for the few computers available to students and teachers.



In January, 1975 the Altair was introduced in the pages of *Popular Electronics Magazine* and David Ahl realized that the new microcomputers would be available to more schools than the expensive minicomputers. He started to feature articles about micros and to convert some of the software in BASIC for use by these "baby" computers with their small memory capacity. At the same time the new microcomputer owners discovered *Creative Computing* as an excellent source of application software and discussion on progamming. By mid 1976 the magazine was running material for both the educational and hobbyist audiences.

Creative Computing was originally printed on newsprint stock (just like this magazine) but carried no advertising except in-house ads. In 1976 David realized that to fuel the growth of the magazine he had to have ads. By the November 1976 issue the magazine had gone "slick" and carried advertising.

Creative Computing continued to grow with the expansion of the personal computer industry. The magazine was largely software oriented but also carried enough hardware articles to keep the interest of the growing computerist clan.

Like all magazines, *Creative* reflected the personality of its Editor and it became known as a magazine that dared to "tell it like it is." Dave and his crew attended all the shows and were very much a part of the general sprit of the booming industry in the early days.

By 1978 *Creative Computing* had a circulation of about 60,000. This was composed of one third educators and two thirds hobbyists. It was projected that financially the magazine would hit the $1 million mark. Under these conditions David Ahl quit his job as Marketing Manager for the Bell System in July 1978 to incorporate his company and plan for the future.

David started to build a mini publishing empire going into the book publishing and selling business, the tee shirt business, and the software business. He also bought up several other magazines which were foundering, such as *ROM* and *Small Business Computers*. Observing the growth of the Sinclair Computer Dave started *SYNC* a magazine devoted to that computer. In addition, Dave took over *Microsystems Magazine*, a publication devoted to S-100 and CP/M computers. This magazine had been started by Sol Libes and was highly respected as a technical journal. Sol, who was also an educator did not realize the huge amount of work connected with the regular publication of a magazine besides editing it. Once he started the magazine he was happy to sell out to David Ahl and remain as Editor.

Meanwhile back in New York City, the huge Ziff Davis publishing empire was waking up to the fact that they had missed the boat after launching it! Once the response to the Altair became so great that it started the personal computer industry, Art Salsburg, Editorial Director of *Popular Electronics*, and his staff proposed that Ziff start a microcomputer magazine in 1976. They even had a complete dummy made up of the proposed magazine. It was turned down on the grounds that there were only a few thousand computer nuts, not enough to support a magazine! By 1980 big companies were in the personal computer business and Ziff awoke to the potential of computer magazines. First they tried to buy *BYTE* which was up for sale and they missed by a few days, McGraw Hill got there first and closed the deal. Ziff Davis then turned to David Ahl's mini empire and in 1981 bought *Creative Computing* with the services of Dave Ahl.

You may wonder why the publishers of *BYTE* and *Creative Computing* sold out to the publishing giants when they were on the threshold of financial success. It is simply that magazine publishing is a capital intensive business, you need a lot of money to make a lot of money. The printing, mailing and distribution costs must be paid for before one copy moves to the subscriber or newsstand. The labor and overhead costs must be met long before invoices are collected. Growth takes a big investment and only the big publishing companies could afford the gamble.

The deal that David Ahl made with Ziff Davis left him in control of *Creative Computing* and kept the magazine in its Morris Plains home rather than moving it to New York City. The magazine continued to grow and kept its standard of excellence, but as the computer market changed so did the readership. Other magazines entered the educational field, the hobbyist market grew to be a smaller percen-

continued on page 14

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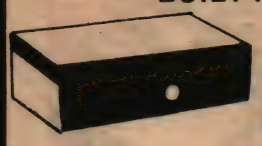
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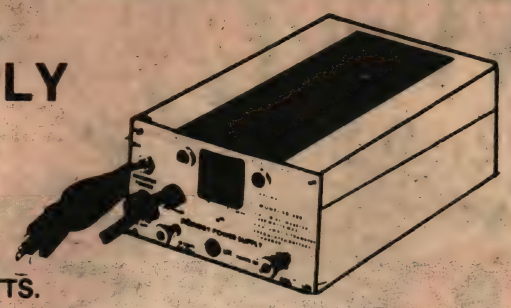
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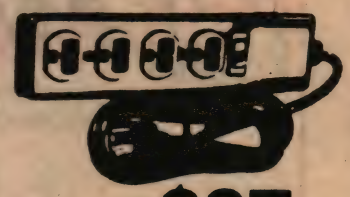


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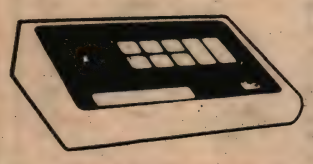
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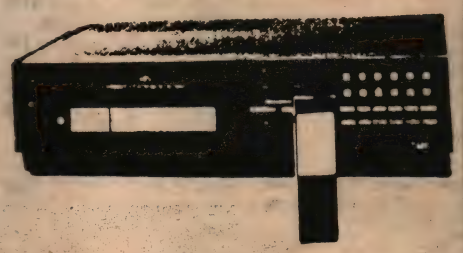
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Editorial

By Stan Veit

I have spent part of the time since my last Editorial in the hospital and when I emerged all patched-up and as good as new, I found that two more major computer magazines, *Popular Computing* and *Creative Computing* have died and gone to the great newsstand in the sky. One of them, *Creative Computing*, was a favorite of mine and was the first magazine devoted to the computer hobbyist. How this came to happen is the subject for another Chapter in Stan Veit's History, elsewhere in this issue.

The continuing demise of computer magazines and the general recession in the computer and electronics industries are a result of the normal business cycle of any new technological development.

When the personal computer was developed ten years ago it was a toy for us "techies." We wanted to find out what we could do with our 8K of RAM memory, our BASIC language and our Teletype printers. Being intellectuals of a sort, we read everything we could get our hands on that would teach us more about our computers. Magazines flourished, *BYTE*, *Interface Age*, *Creative Computing*, *Killobaud*, *Popular Electronics* were our textbooks and the medium through which we shared our growing knowledge of microcomputers. Most of these were small magazines with advertising rates low enough so that a newborn company could afford to buy an ad to announce its existence to the world.

In the next phase of personal computer development, the machines grew in power and larger companies came into the business, Radio Shack, Texas Instruments, Apple, Processor Technology, Cromemco, Visicorp, Microsoft, Digital Research. These companies had money to advertise and real products to sell to the public. More magazines were started, more books were published. Now the public became interested and since computers were expensive, they bought up all the books and magazines they could find. The magazines grew and more of them were started. It seemed that every one even remotely connected with the publishing business was starting a new personal computer magazine. Circulation increased and the ad rates increased with the new size of the magazines.

In the next phase IBM, AT&T and the giants entered the field. New companies fueled by venture capital poured money into advertising and computer magazines became two inches thick! When you went into a magazine store you found an entire wall covered by computer magazines. Book publishers were making million dollar deals from books that would have a shelf life of three months! At one point *Computers & Electronics Magazine* claimed 650,000 circulation and *BYTE* was slightly behind that. The cost of a single advertising page in these monster magazines went to $16,000 for black and white, more for color. The big advertisers like Apple, AT&T and IBM had ad budgets in the tens of millions to spend on magazine ads, TV ads and newspaper advertising.

The bubble had to burst and in 1984 and 1985 the personal computer industry started to shrink back to a more "normal" size. The wall of useless magazines and repetitious books fell on the publishers as they desperately tried to dig their way out. Unfortunately some good publications died with the bad and a lot of good people suffered from the death of their jobs.

One of the problems with magazines is subscriptions. Advertisers base their evaluation of a magazine up on how many potential buyers the magazine can deliver each month, in other words how big is the magazine circulation. In order to get big ad prices the computer magazines had to deliver a huge number of readers. In order to get them the magazines resorted to intensive advertising campaigns wherein they almost gave the magazine away to get the subscription. The cost of printing and distributing the magazine was supposed to be covered by the advertising rates, that is why they charged so much for an ad page. When the business of selling computers slowed down and the venture captial ran out the manufacturers stopped advertising and the magazine's income disappeared. Even the biggest publishing houses couldn't stand these losses so they folded the magazines.

However a subscripton is an obligation to deliver a monthly magazine for one, two or three years. At first the publishers gave the subscribers a chance to shift their subscription to another computer magazine, but they are running out of magazines to shift this obligation to. In this case they will have to refund cold hard cash and that is going to hurt even the biggest publishers. It will be very interesting to find out what happens to all these obligations.



However things in the computer industry are starting to level out and within the next year the personal computer industry will resume its growth. This time it will be on a basis of offering solutions to real needs and the delivery of wanted information.

The entire graphics and publishing industry is computerizing. The retail store will be the next huge industry to completely computerize. The small office is just beginning to add the computer to its office machines. In larger businesses, 1985 was the first year they invested more in office machines than in factory machines. This industry is just pausing before a great move forward.

As for magazines and books, the public is a lot smarter now, they are more selective and they want something for their dollars. *Computer Shopper* continues to grow because we offer our readers information untainted by fear of offending manufacturers. Our ads offer merchandise at the lowest prices in the industry, our classifieds offer the chance to buy good used equipment and to sell your computers, peripherals and software. To our advertisers we provide a national readership who are real buyers and our rates are lower than any other national computer magazine.

To our subscribers we offer a great magazine at a low cost and the assurance that we will not disappear before your subscription runs out! It has been hard to find this magazine on the newsstand in some parts of the country. We don't print tens of thousands of copies more than we can sell just so we are visible on every newsstand. However, we realize that the demand has outstripped the supply and we will increase the quantity available on the newsstand in 1986. Meanwhile, be sure you don't miss an issue by entering your subscription now. ●

The Riddle of the Digital Sphinx

by Les Solomon

Way back in the dim dark ages of my school days, I seem to remember someone telling me that the great Sphinx of Egypt was a riddle wrapped in a mystery enclosed within an enigma — or something like that.

That is exactly the way that some people look at a computer — especially when things go wrong and the machine either comes to a grinding halt, or it starts acting very strangely.

Of course, Murphy's Law states that a computer "crash" usually occurs so as to cause the maximum of damage at the worst possible moment (think of the mass of data you so painfully gathered and entered during the past couple of hours all going down the drain).

It is at crash time that some of us reach for a liquid antidote to alleviate the stomach cramp or headache (or both) that usually accompanies a "crash," while teetotalers usually utter such expressions as (explicitive deleted) and attempt to bring horrible supernatural curses down on the system manufacturer.

However, most of us being of the rational type, grit our teeth and accept the fact that the system (and our data) has left town without a forwarding address.

We then try to find out what went wrong, then rectify it. Most of us can smile a little knowing that we have been backing up our data every couple of pages or so (you have been storing your data as you go along, haven't you, or did all your stuff go down the tubes)?

Since a typical user is more software oriented than hardware oriented, the electronic innards of a computer assume a Sphinx-like mystery. After all, we know that no rational person can follow the interlocking electronic maze that makes up a modern digital computer.

But all is not lost. The machine manufacturer has come to our aid by providing us with the means not only to check the inner workings of the machine, but also allow the machine to display its problem and possible solution on the video screen, or make a hard-copy on a printer.

This technique is called "diagnostics" and is usually provided in ROM or on a diskette. But don't breath a sigh of relief just yet, because the chances are very good that regardless of who created them, **these diagnostics will not work!**

"Wait a moment," you may say, "I have personally used the diagnostic software, and it really works."

Absolutely true, but, didn't you try out this software when there was nothing wrong with the system, and you were just simply curious as to what the diagnostics did?

Keep in mind that for a computer to either "call" and use the diagnostic ROM, or extract the program from the diskette and run it, the system must essentially be in good working order! This, of course, includes just about all ICs in the system including the CPU, RAM and ROM, the disk port, and even the diagnostics program (software) itself.

For example, if you assume a bad CPU, how do you run any diagnostics? Or how do you download diskette material when some element

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Stan Veit's History
continued from page 8

tage of the people who were interested in computers. *Creative Computing* became a general computer magazine which tried to please a varied readership. It lost the character that it originally had because it was trying to reach a much wider readership. It was a good magazine and it should have succeeded except for events beyond its control.

Ziff Davis made *Microsystems* into a technical journal for CP/M and the CP/M market became smaller and smaller in the face of competition from MSDOS. For a while it looked like CP/M-86 and CP/M-68 would establish a parallel market but it just never worked out. Under this condition, Ziff Davis folded *Microsystems Magazine*. The subscriptions were largely transferred to *Creative Computing*. When Timex quit making Sinclair computers, Ziff Davis killed *SYNC* magazine. The subscriptions were transferred to *Creative Computing*.

In an attempt to have the computer magazine with the world's largest circulation, Ziff Davis changed the title of *Popular Electronics Magazine* to *Computers & Electronics*. They also changed the contents, deleting most of the "electronics" and then they changed the staff to reflect their new policy. Since I was a part of this change (I resigned and came to *Computer Shopper*) and I wish to be kind, I will only say that it did not work. Ziff Davis killed *Computers & Electronics Magazine* and "folded" it into *Creative Computing*.

The resulting *Creative Computing Magazine* (With *SYNC*, *Microsystems*, *Computers & Electronics and Popular Electronics*) completely lost its identity and character. When the recession hit the personal computer industry and ad pages became fewer and fewer, Ziff Davis killed *Creative Computing*.

I will treasure my volume of the Tenth Anniversary issue of *Creative Computing*. Next to *Computer Shopper*, it was my favorite magazine. To David, Betsy, and the staff I extend my condolences. You folks did a good job, you can write for me any time. To my former bosses at Ziff Davis I do not wish to make you the villain in this death, busines is business and you can not afford losses. ●

Riddle of Sphinx
continued from page 13

within the disk port is no longer operative? If you stop and think about it, if one or more RAM, ROM, or supporting ICs are defunct, bye bye diagnostics.

Now you know why (a few photographs back) I said that the diagnostic program may not do you any good.

Let us not stop on this very sad note, but let us try to unravel the Mystery of the Digital Sphinx.

We now know that we cannot depend on the questionable computer — so what do we do? The answer is to use a relatively new diagnostic approach called "In Circuit Emulation" (usually abbreviated to ICE) — a hunk of hardware that will soon be familiar to computer users.

The "magic" starts when you are told that all the ICE system requires from the questionable computer is that there is DC power to the pertinent bus traces and that the system "clock" is woking. These two items can be confirmed with a DC voltmeter and a scope. **The ICE system does not need anything else from the system under test.**

What is in this almost magical ICE device? As shown in the illustration (courtesy of Nicolet Paratronics, Fremont, CA), the main element is a CPU of the same type that the faulty system uses, a very specialized "operating system" in ROM, some special hardware and two outside-world interfaces — one to the faulty target computer, and the other for an RS-232 video terminal.

The ICE device interfaces with the target system simply by removing the computer CPU and replacing it with a multi-conductor cable terminated in a lead-mating pod. This may pose a problem in some systems since the CPU may be soldered into the board. At this writing we assume that the physical CPU chip can be removed from its socket.

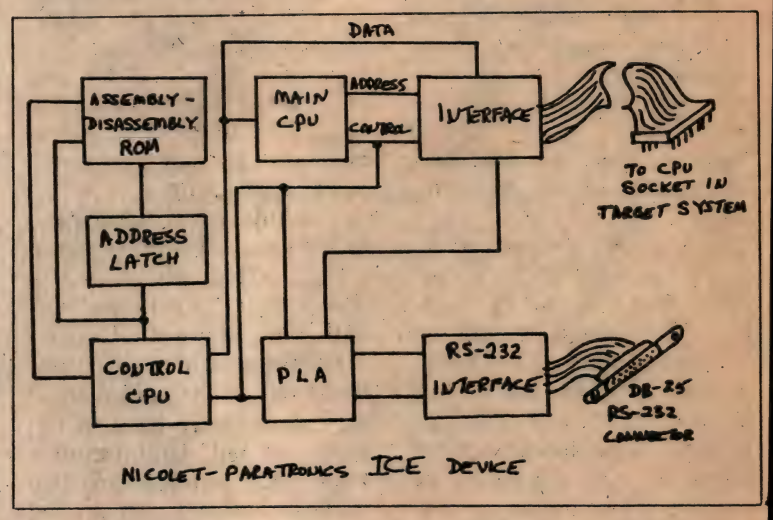
In operation, the ICE system is in full control of the target computer.

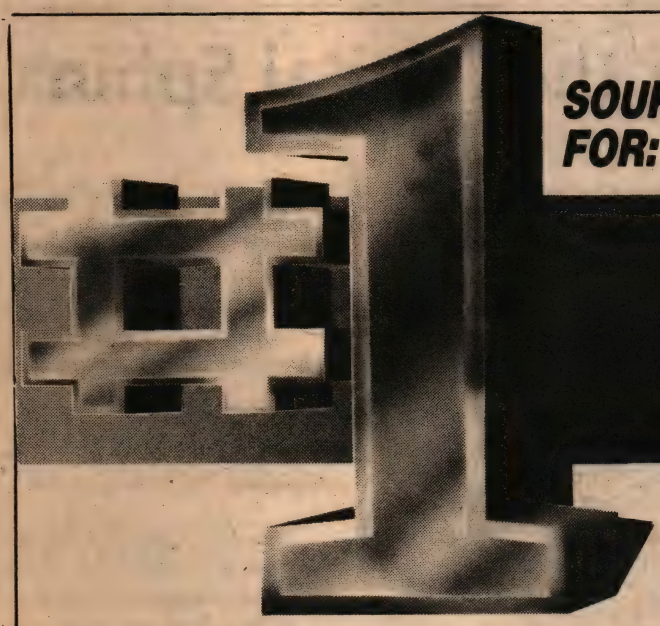
Note also that the ICE system has its own RS-232 interface. This means that almost any kind of external RS-232 terminal can be used to display all ICE data — or it can be printed out if desired.

Once the ICE device is coupled to the target computer CPU socket, it can now use its internal ROM "operating system" to call any of 48 commands available.

Using one portion of the 48 tests built into the operating system ROM, the ICE system and its assoicated video ter-

continued on page 93

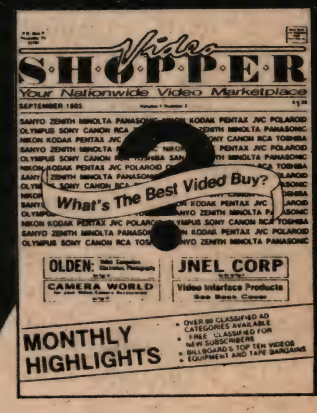




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FEEDBACK FORUM

Dear Editor:

I am the proud owner of a Commodore/64, using two 1541's and a Star SG-15 printer with a Cardco + G Interface.

I have used this combination for about two years. I have the following Programs; Word Pro 3 Plus, Word Processor/64, Paperclip and Homeword. And I have just acquired Fleet System 2. All I can say about this program is, it's about time.

The reason I bought so many word processors, is I have been looking for one that would have, the eighty column mode and be able to type in the same mode. Well I can't say enough about Fleet System 2, except. (1) I can't use my two disk drives, and (2) when in the Video Mode (80 column Previewing, which is fantastic, the best I've seen yet) you must go to the end of the text, to escape back to the typing mode.

Another thing that is bothering me is, I could not, at the time, find a spreadsheet that would allow me to print the full width of the SG-15 printer. I'm using Calc-Result Advanced, and thru some trial and error, more of the latter, I found that using the NLQ mode, I can now print a full page. Also, most programs for the Commodore will not recognize that there can be two 1541's in series. They will work with dual drives OK, but not two in series. Word Pro 3, would accept drive #2 as well as drive #0. I recognize that there are other drives on the market. But, they are either, not totally compatible or very expensive. On Oracle, my data base, there isn't a real need for a dual drive, however when transferring data, or backing up a file, I must use one of those copy programs. It won't transfer SEQ files completely.

I am really looking forward to the Commodore 128, when it gets on the market. I've read so many articles about his wonder machine, including the one you printed in *Computer Shopper*, I must get one. I haven't used CP/M before, but it seems to me, this would open a lot of doors. I have a use for my computer, as well as having fun with it, and the things I haven't been able to do in the past seems available on this new, Commodore 128.

I enjoy your paper very much. I read all the columns and all the ads, every word over and over. One thing I've found in this computer world, there is so much to learn, and not many to learn it from. So thanks for a cheap education.

I would like very much to read a report on the product "1541 Flash." I just received the July issue of *Computer Shopper*, so excuse me, please.

J.H. Tifft
Chelsea, MI

Editor's Note: Thank you for your kind words. We think the Commodore 128 will be everything you expect.

Dear Editor:

Since you carry such excellent material on "orphan computers," I would like to ask your readers for help with a problem on an "orphan peripheral."

I have been using a typewriter modified with an Escon Products computer parallel interface installed by Escon for about four years. Escon Products of San Ramon, California are apparently no longer in business. My typewriter/interface no longer correctly selects the correct bail codes from the interface instruction unless tipped 45 degrees, front upmost. Therefore, I think this is a mechanical interface adjustment or a lubrication problem. I have been unable to solve this problem with any adjustments that I have tried.

Is there anyone out there who can suggest a repair facility skilled in the adjustment of both the Selectric and Escon interface solenoid assembly as a mated pair?

R.L. Fuess
Newark, CA

Editor's Note: Our experience with these conversions have shown that the problems usually lie with the typewriter mechanism. We had ours repaired by a skillful Selectric typewriter repair person in New York. There should be many such mechanics in the Bay area.

Dear Editor:

I am an amateur photographer and hosue rebuilder. Both of these activities require layouts, scale drawings and floor plans. I don't think I need a full Computer Aided Drafting system at $2000 plus for the software but I do need to be able to draw scale lines and print them.

For the past year I have been playing with an Atari 800XL and have built up tremendous frustration at what it won't do or at least what I can't get it do do. I can draw pretty pictures with a Koala Pad but I can't draw them to scale and I can't print them. Then there is software called "Printwiz" which doesn't work at all. "Print Shop" and "Atari Writer" work very well on the 800XL and my Star printer but they don't help me draw scale plans.

I am ready to move on but now I realize the software comes first. I need the ability to draw scale plans and be able to print them. Until I can find the proper software all those great ads telling me how cheap I can buy an Eagle, Fox, Wolf, Compaq, Macintosh, Panasonic, Sanyo, Zenith, Zorba, etc. doesn't mean much to me.

Please have a few articles on CAD, preferably very simple systems if any exist.

Lynn Ellsworth
Albany, NY

Editor's Note: We will try to find them for you. However, the "cheapest" at this point is to use a MSDOS machine with loads of memory. Wait for the Atari 520ST and Commodore/Amiga. Then you will see low cost CAD/CAM.

Dear Editor:

In the past you touted the Memotech MTX512 computer as being the greatest thing in 8-bit Z80 machines to come down the pike since the Altair! Well I listened to you and bought one. I cannot say that you were completely wrong, it does have all the features you said it had and it is a fine machine, however it had the shortest life of any machine in history! It died so fast that it did not even leave a User's Group to mourn its passing. Here I am with an outcast, dead machine with great potential. I suppose that's business and I am stuck, but there should be a law requiring some support be assured before any new computer can be sold in this country.

Is there anyone else like me who has a Memotech MTX512 and wants to form a User Group to help each other out? Is there any chance anyone has added a floppy disk to this machine?

Please help me by writing in care of *Computer Shopper*. Thanks.

Dan Wade

Editor's Note: Sorry about that. The MTX512 is still alive in England. I hope you find some User Group members.

Dear Editor:

The "Flamingo Micro" advertisement on page 22 of your November 1985 issue of *Computer Shopper* is a perfect example of the appalling sexism that provokes the computer industry. We are the "hidden" computer lovers (not "hackers"-- shades of ax murders and other violence), whom publications such as yours pretend didn't exist. I don't read the *Shopper* because I want a "poor person's" *Playboy*--I read it because I own two complete computer systems. I am a business owner, and know a lot more about what I am doing than all of your adolescent readers would like to know about.

I have news for you and them--Women like machines, too, and we're here to stay.

Barbara Lifton
Hamden, CT 06517

Editor's Note: We sell ad space, but we do not censor the ads as long as they are not fraudulent. If you feel Flamingo is sexist, write them a letter about it.

Take a look at the mast head of *Computer Shopper* and you will see that we are hardly a "sexist" organization. (Except that we might be a little short on men!)

Dear Editor:

As a faithful reader and subscriber since your magazine started, I'd like to make a suggestion. I've been disappointed to see the classified ads dwindle dramatically over the years. The November issue only has about 12 pages out of 300! I don't think this is because your readers have less used computer gear to sell.

Bargains purchased form individuals are more exciting and usually better "deals" than from companies, as evidenced by the popularity of swap meets, flea markets and garage sales.

I propose that you give about 30 words of FREE classified ad space quarterly (4 times per year) to your non-business subscribers. It looks like the income from 12 pages now wouldn't be much of a loss and this would make your magazine more interesting and attractive.

Thanks for considering this idea.

Paul Enright
Rochester, MN 55905

Editor's Note: Actually our classifieds have grown a little, but 12 to 15 pages of *actual classifieds* are more than anyone else has. We could increase the size of the classifieds by lowering our standards as to what a classified ad is but then it would fill up with dealer ads.

Dear Editor:

I have a Timex Sinclair 2068 computer. I would like a dealer to contact me. I am interested in buying a disk drive and a Visicalc for such machine.

Thanks in advance for your cooperation.

Mario Cremaschini
VEDIA 267
3500 RESISTENCIA-CHACO
ARGENTINA

Dear Editor:

My Franklin ACE 1200 has problems. No one wants to talk about it, they say: GO TO FRANKLIN.

The president of FC Co. DID NOT EVEN answer my letter asking for help.

You seem to like them. They have changed their phone or disconnected it. There are no dealers, no repair shops for Franklin.

Can you give me advice?

The CP/M System and the second disk-drive work intermittently.

Al Lancz
Milltown, NJ 08850

Editor's Note: Franklin Computer has sold a lot of their older machines through ads in *COMPUTER SHOPPER*. So far we have gotten no complaints about their service or support. There must be something wrong with your problem. We will contact the management at Franklin and try to resolve your problems.

Errata:

The correct company and their address for information about the new Magnum PC/XT computer is Magnum Computer, 7917 Southwest Nimbus Avenue, Beaverton, OR 97005; (503) 643-5074.

This article appeared on page 95 of the December issue of *Computer Shopper*. ●

Reprints

Starting with this issue, *Computer Shopper's* readers wanting reprints of articles can obtain them on 8"X10" format for $3.50 per copy.

Lyco Computer Marketing & Consultants

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1541 Drive	189
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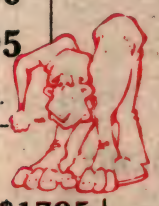
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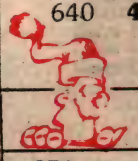
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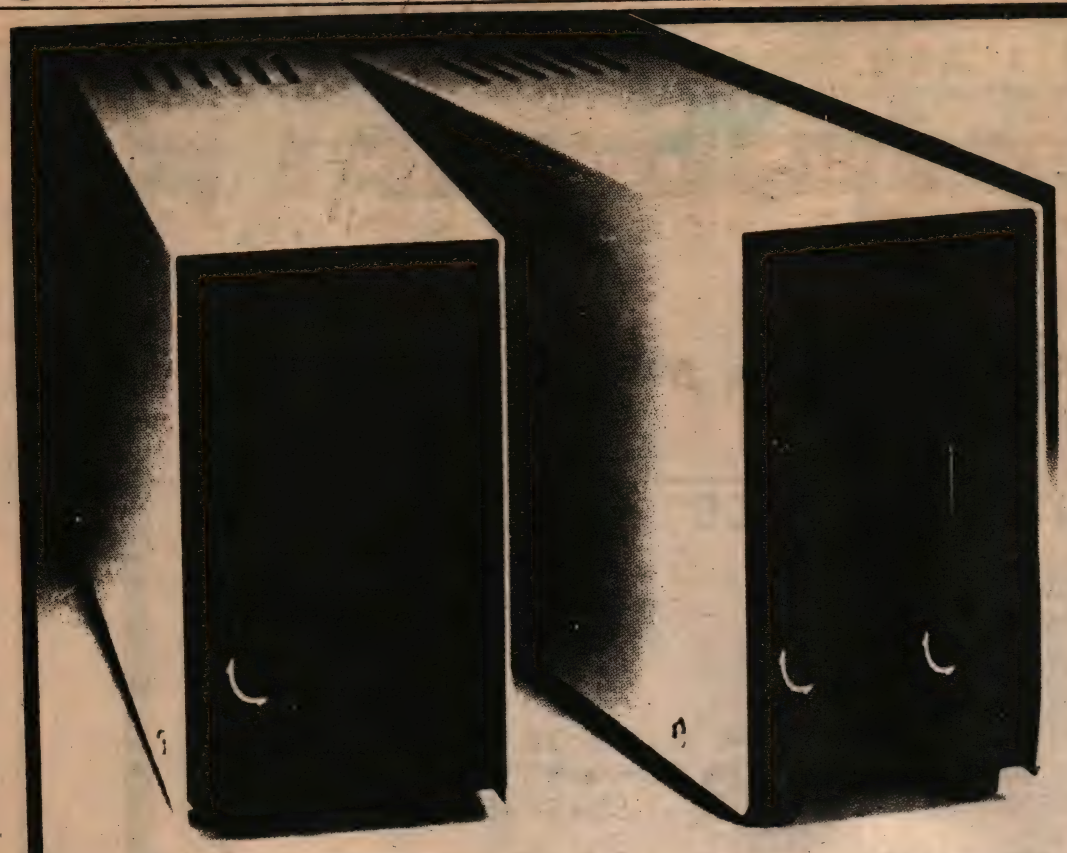
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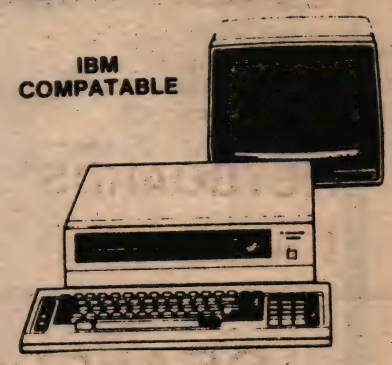
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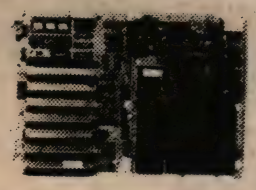


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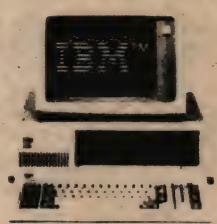
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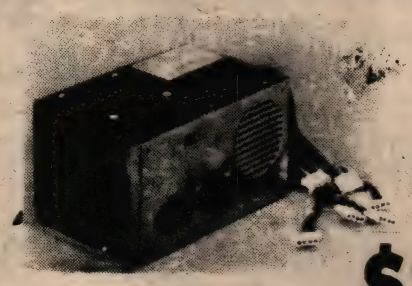
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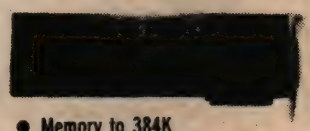
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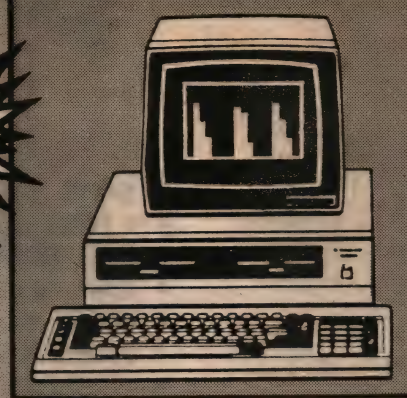
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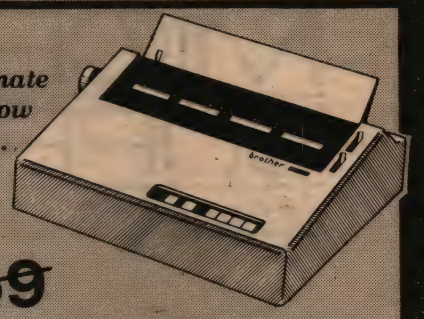
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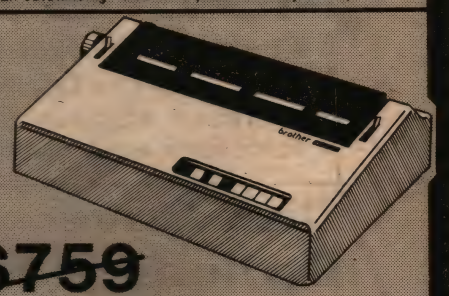
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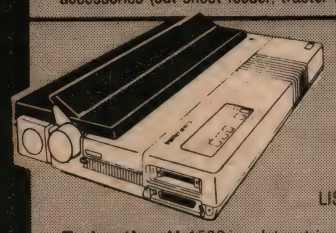
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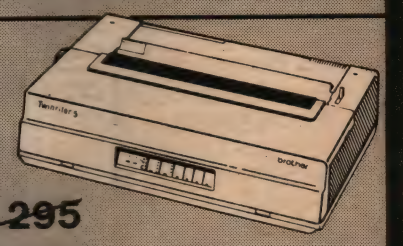
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The **brother** M-1509 is a dot matrix printer designed to offer reliability, economy, and quiet, easy operation to users of personal or small business computers. Normal print speed is a fast 180 cps (pica), but the M-1509 also provides handsome Near Letter Quality printing at 45 cps. A variety of character sets are available, and the high-density bit image capability produces impressive graphics.

The M-1509 also incorporates a number of cost- and labor-saving features. The large memory buffer releases the computer for other tasks while printing, an optional cut sheet feeder reduces paper-handling time, and the one-inch paper cut function economizes on paper. In addition, the M-1509 is supplied with character sets and control codes compatible with those of the IBM PC and the Epson FX series printers, for easy interfacing with a broad range of computer equipment.

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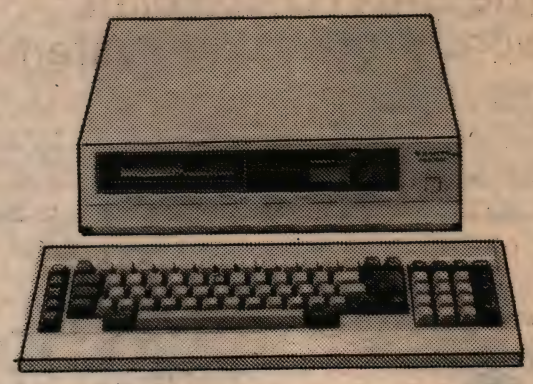
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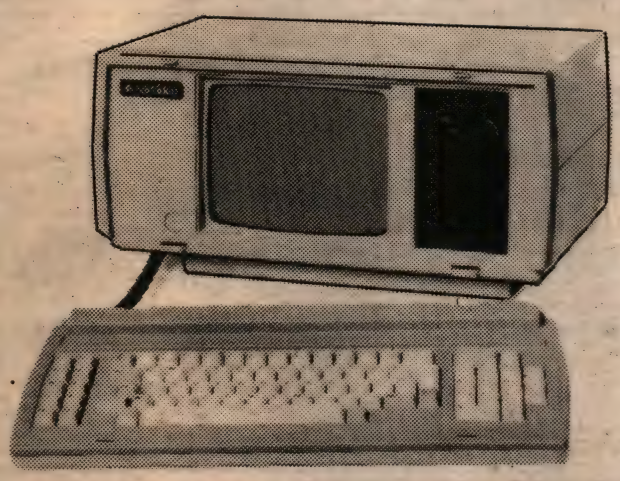
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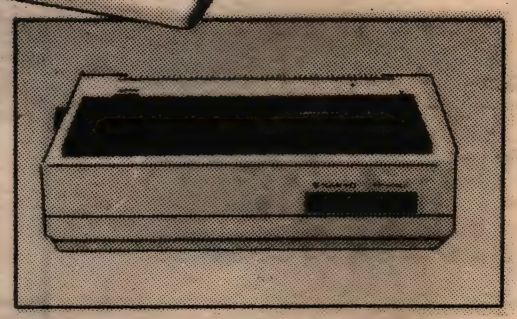
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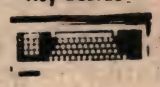
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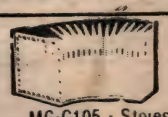
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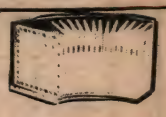


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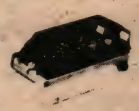
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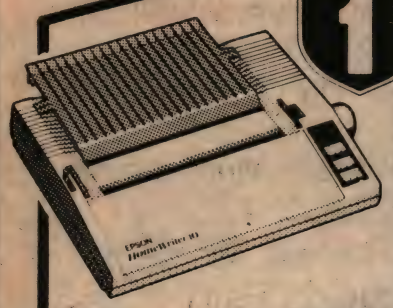
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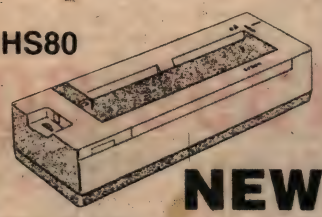
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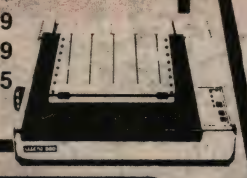
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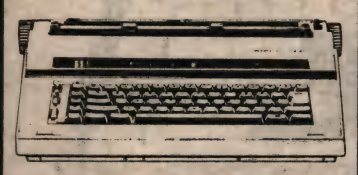
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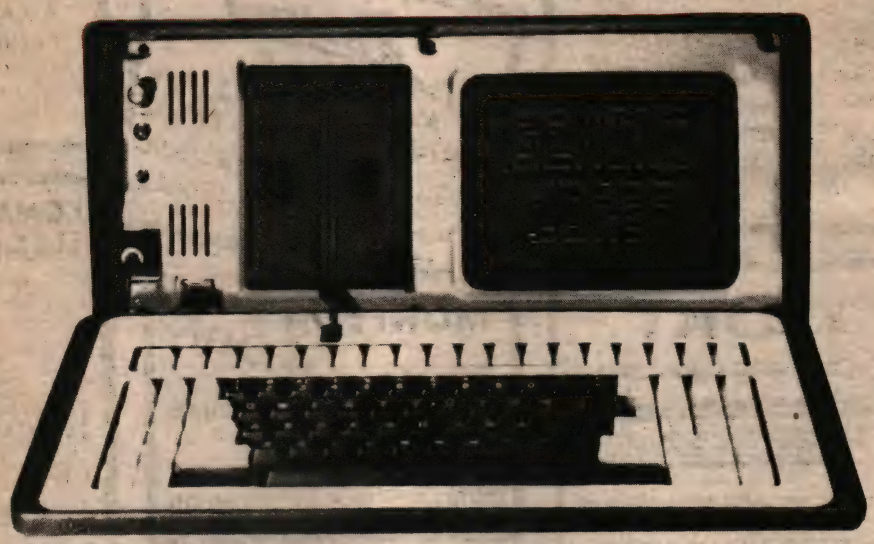
Everyone has heard it already, BIG BLUE is still there; just cheaper! Due to the competitiveness of the current computer industry and Japanese influence, GEMINI has found it necessary to rethink its buying and marketing strategies. Now with new purchasing agreements in hand and added buying power GEMINI is proud to announce the ZORBA at a New Lower than Low Price. The heat is on for MS DOS! CP/M is still alive, and now more affordable!

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PORTABLE COMPUTER

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- 9" GREEN OR AMBER CRT
- 19 INDEPENDENT, 55 PROGRAMABLE FUNCTION KEYS
- TWO 400K DSDD DRIVES
- 64K BYTES 150 NS RAM
- C BASIC COMPILER
- IEEE 488 BUS MASTER PORT
- 24.6 LBS
- CPM 2.2 OPERATING SYSTEM
- M80 (L80, LIB80, CREF80)
- SOURCE CODE OF THE BIOS PLUS UTILITIES
- DATA COMMUNICATIONS SETUP PACKAGE
- SERIAL & PARALLEL PRINTER PORT
- DATA COMMUNICATION PORT



OPTIONS:

- 16 BIT 256K RAM UPGRADE (8088 CPU) $600.00
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with two 400k or 800k Drives

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General Specifications

ZORBA is the lowest cost full featured portable computer. This light weight computer is ruggedly packaged in a convenient carrying case. The case surrounds a strong inner chassis which further protects the Z80A based computer with its two double sided double density disk 400K drives, large easy to read 9" display screen and well designed detachable keyboard.

ZORBA uses CP/M, the industry standard operating system, which means that a wide range of existing software is readily available to the user.

The ZORBA users manual covers operation of the unit, all supplied software and all interface and internal information. A system diskette is supplied with all system files and utilities. A second diskette contains the sources for all ZORBA software including BIOS, SETUP, FORMAT, and PATCH.

Keyboard

Keyboard communicates serially with CPU
Detachable with 2 foot coiled cord
95 keys in standard QWERTY format
13 Key Numeric pad
Independent Caps Lock and Shift Lock
55 Software programmable function keys
All keys auto-repeat after 1 second delay
All Standard cursor and terminal control keys

Disk System

Controller: WD1793
Drives: 5.25 Double Sided. Double Density. 400K 48 TPI

Built-in disk interchange formats: Xerox 820 (SD, DD), Kaycomp (DD), DEC VT-180 (SD), Osborne (SD) and IBM-PC (eg. CPM/86) and Televideo 802 (Read/Write and Format compatibility) (Expandable to 82 Formats)

Specifications
General Mechanical and Electrical

Width	-17.5 inches (44.45 cm)
Height	- 9.0 inches (22.86 cm)
Depth	-16.0 inches (40.64 cm)
Weight	-24.6 pounds (11.1 Kg)
Power	-80-130 VAC or 190-245 VAC 50/60 Hz 170 watts max

Display

Display Tube:
9" diagonal, Green or Amber
High resolution display circuitry
60 Hz refresh rate

Display Format:
25 lines x 80 columns
5x7 Character Font with full descenders
128 ASCII Characters
8x9 32 Characters Graphic Font
2K Memory Mapped Display Buffer

CPU Board

Z80A CPU running at 4 Mhz with no wait states
64K bytes of 150 ns RAM (58K after CP/M loaded)
16K bytes of EPROM (2732) can be switched in and out by software 12K available for user EPROMS
8275 CRT controller, DMA driven
1793 Floppy disk controller, SMC data separator
Bipolar proms configure 10 addresses
Fully structured interrupts prioritized by bipolar proms

Interfaces

- Full asynchronous RS232 port with modem control. Baud rates and data translation and protocol programmable
- Full asynchronous full duplex RS232 port with hardware handshake (for printers). Baud rates and protocol programmable. (Serial Printer Port)
- One 8 Bit parallel port with independent strobe and ready lines. Supports Centronics interface with an available adaptor cable.
- IEEE 488 Bus Master Port (ie: General Purpose Instrumentation Bus) not Software Supported.
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GW Basic **75.00**
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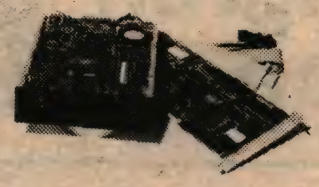
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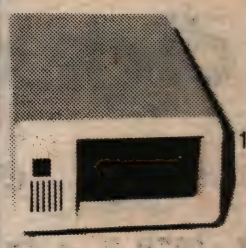


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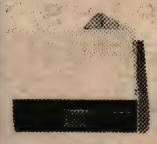
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X	H	U	M	S	P	A	S	S	W	O	R	D
U	S	R	O	B	O	T	I	C	S	H	O	O
M	F	U	D	U	D	F	F	F	W	W	H	R
Y	U	A	E	A	S	T	T	I	N	C	C	P
B	T	O	M	H	V	J	L	W	E	A	N	K
A	S	W	S	A	T	L	S	T	A	T	A	R
B	O	D	D	F	E	E	I	P	J	R	F	O
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N	C	L	X	A	L	N	B	O	X	A	B	T
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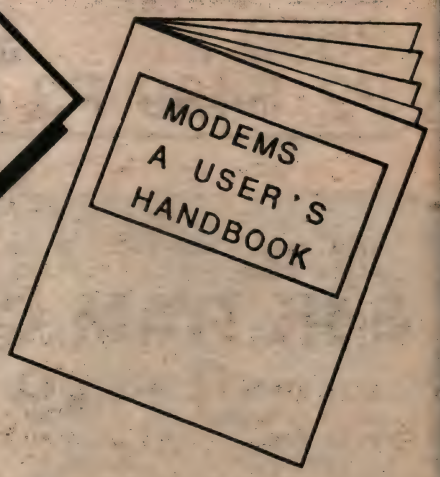
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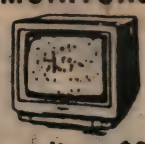
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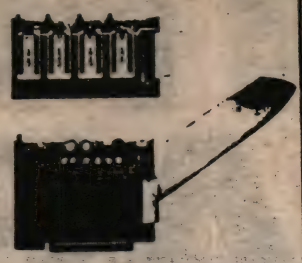
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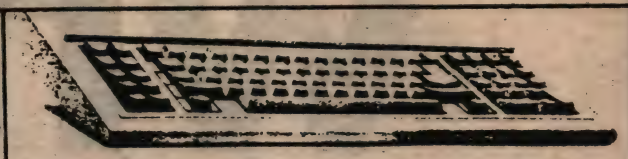
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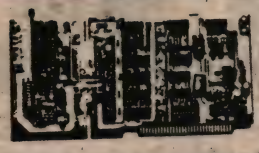
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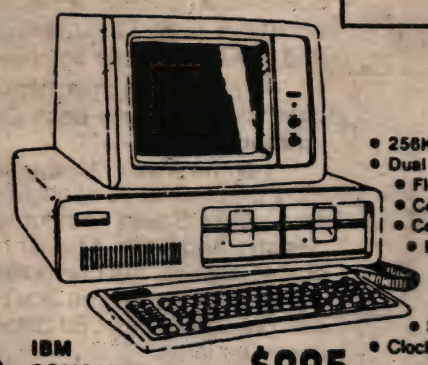
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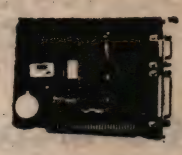


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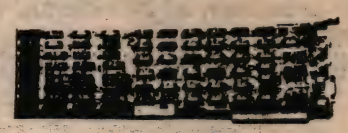
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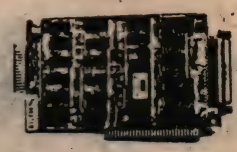
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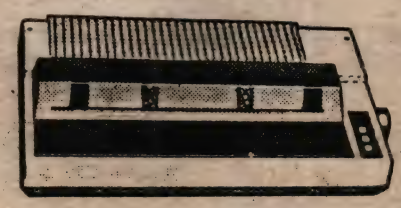
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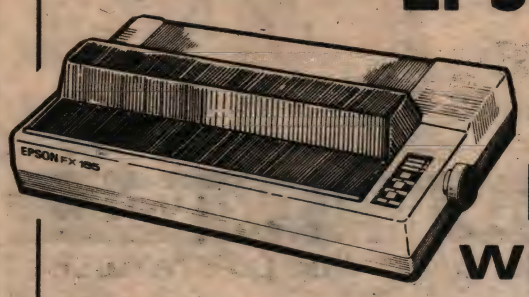
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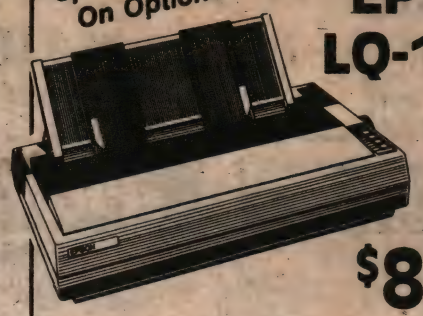
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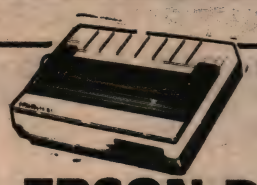
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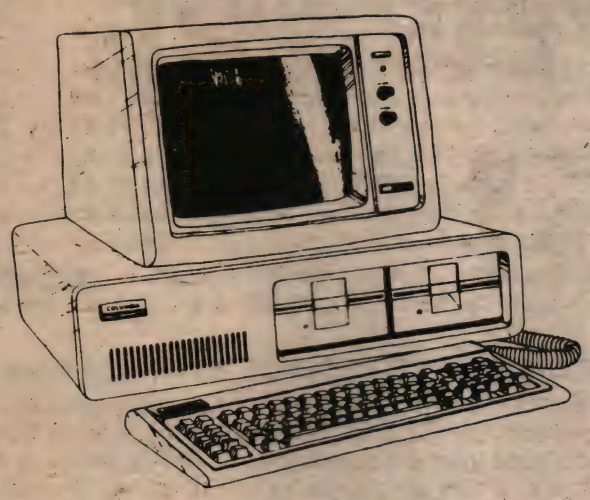
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These programs include: • MS-DOS 2.11 • MS-DOS tutorial • BasicA 2.0 (This runs all the IBM GW BASIC programs we tried) • Perfect Writer • Perfect Writer tutorial • Perfect Speller (50,000 words) • Perfect Calc spreadsheet • Perfect Calc tutorial • Perfect Filer DBMS • Fast Graphs (color) • Perfect Link (modem program) • Home Accountant Plus • Columbia MPC tutorial • Space Commanders • Hardware diagnostics •

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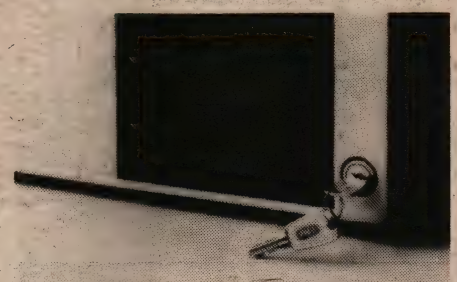
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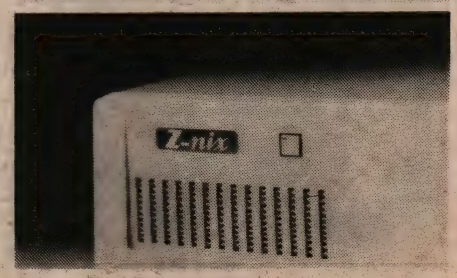
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SN7437N	14	.29	SN74126N	14	.49	SN74195N	16	.79
SN7438N	14	.29	SN74128N	14	.49	SN74196N	14	.99
SN7439N	14	.69	SN74132N	14	.49	SN74197N	14	.89
SN7440N	14	.15	SN74136N	14	.69	SN74198N	24	1.35
SN7441N	16	.89	SN74141N	16	.89	SN74199N	24	1.35
SN7442N	16	.45	SN74142N	16	2.95	SN74221N	16	.89
SN7443N	16	.79	SN74143N	24	3.95	SN74251N	16	.89
SN7444N	16	.79	SN74144N	24	2.95	SN74273N	20	1.95
SN7445N	16	.69	SN74145N	16	.65	SN74276N	20	2.49
SN7446N	16	.79	SN74147N	16	1.69	SN74279N	16	.59
SN7447N	16	.79	SN74148N	16	.89	SN74283N	16	1.39
SN7448N	16	.79	SN74150N	24	1.29	SN74284N	16	2.95
SN7454N	14	.19	SN74151N	16	.29	SN74285N	16	2.95
SN7459N	14	.59	SN74152N	14	.49	SN74385N	16	.59
SN7460N	14	.25	SN74153N	16	.39	SN74366N	16	.59
SN7470N	14	.39	SN74154N	24	1.25	SN74367N	16	.59
SN7472N	14	.39	SN74155N	16	.49	SN74368N	16	.59
SN7473N	14	.35	SN74156N	16	.65	SN74390N	16	1.49
			SN74157N	16	.49	SN74393N	14	1.49
			SN74158N	16	1.39			

74LS

74LS00	14	.19	74LS133	16	.49	74LS253	16	.49
74LS01	14	.19	74LS136	14	.39	74LS257	16	.39
74LS02	14	.19	74LS138	16	.39	74LS258	16	.49
74LS03	14	.19	74LS139	16	.39	74LS259	16	1.19
74LS04	14	.25	74LS145	16	.89	74LS260	14	.49
74LS05	14	.25	74LS147	16	.99	74LS261	16	1.49
74LS06	14	.99	74LS148	16	.99	74LS266	14	.49
74LS07	14	.99	74LS151	16	.39	74LS273	20	.79
74LS08	14	.19	74LS153	16	.39	74LS279	16	.39
74LS09	14	.19	74LS154	24	1.49	74LS283	16	.59
74LS10	14	.19	74LS155	16	.49	74LS289	16	3.95
74LS11	14	.19	74LS156	16	.49	74LS290	14	1.49
74LS12	14	.19	74LS157	16	.35	74LS293	14	.79
74LS14	14	.39	74LS158	16	.39	74LS295	14	1.95
74LS15	14	.29	74LS160	16	.79	74LS298	16	1.95
74LS20	14	.19	74LS161	16	.79	74LS299	20	1.49
74LS21	14	.25	74LS162	16	.69	74LS322	20	2.95
74LS26	14	.25	74LS163	16	.49	74LS323	20	2.49
74LS27	14	.25	74LS164	14	.49	74LS347	16	.79
74LS28	14	.29	74LS165	16	.79	74LS353	16	1.19
74LS30	14	.19	74LS166	16	.89	74LS364	20	1.95
74LS32	14	.25	74LS173	16	.49	74LS365	16	.39
74LS33	14	.39	74LS174	16	.49	74LS366	16	.39
74LS37	14	.29	74LS175	16	.79	74LS367	16	.39
74LS38	14	.29	74LS181	24	1.49	74LS368	16	.39
74LS42	16	.39	74LS189	16	3.95	74LS373	20	.79
74LS47	16	.89	74LS190	16	.49	74LS374	20	.79
74LS48	16	.89	74LS191	16	.49	74LS377	20	.79
74LS51	14	.25	74LS192	16	.69	74LS378	16	.79
74LS54	14	.19	74LS193	16	.69	74LS379	16	.79
74LS73	14	.35	74LS194	16	.59	74LS386	14	.45
74LS74	14	.25	74LS195	16	.59	74LS390	16	1.09
74LS75	16	.29	74LS196	14	.89	74LS393	14	.79
74LS76	16	.29	74LS221	16	.59	74LS395	16	1.09
74LS85	16	.49	74LS240	20	.69	74LS399	16	1.09
74LS86	14	.25	74LS241	20	.69	74LS490	16	1.49
74LS90	14	.39	74LS242	14	1.09	74LS533	20	1.95
74LS92	14	.49	74LS243	14	.69	74LS534	20	1.95
74LS93	14	.39	74LS244	20	.69	74LS540	20	1.09
74LS96	16	.49	74LS245	20	.79	74LS541	20	1.09
74LS107	16	.35	74LS247	16	.99	74LS590	16	5.95
74LS109	16	.35	74LS248	16	.99	74LS624	14	1.95
74LS112	16	.29	74LS249	16	.99	74LS629	16	2.49
74LS122	14	.45	74LS251	16	.49	74LS640	20	.99
74LS123	16	.49	74LS253	16	.49	74LS641	20	1.29
74LS125	14	.39	74LS257	16	.39	74LS644	20	1.29
74LS126	14	.39	74LS258	16	.49	74LS645	20	.99
74LS132	14	.39	74LS259	16	1.19	74LS670	16	.99
			74LS260	14	.49	74LS688	20	1.95
			74LS261	16	1.49	81LS95	20	1.49
			74LS266	14	.49	81LS96	20	1.49
			74LS273	20	.79	81LS97	20	1.49
			74LS279	16	.39	81LS98	20	1.49
			74LS280	14	1.19			
			74LS283	16	.59			
			74LS289	16	3.95			
			74LS299	20	1.49			
			74LS322	20	2.95			
			74LS323	20	2.49			
			74LS347	16	.79			
			74LS353	16	1.19			
			74LS364	20	1.95			
			74LS365	16	.39			
			74LS366	16	.39			
			74LS367	16	.39			
			74LS368	16	.39			
			74LS373	20	.79			
			74LS374	20	.79			
			74LS378	16	.79			
			74LS379	16	.79			
			74LS386	14	.45			
			74LS390	16	1.09			
			74LS393	14	.79			
			74LS395	16	1.09			
			74LS399	16	1.09			
			74LS490	16	1.49			
			74LS533	20	1.95			
			74LS534	20	1.95			
			74LS540	20	1.09			
			74LS541	20	1.09			
			74LS590	16	5.95			
			74LS624	14	1.95			
			74LS629	16	2.49			
			74LS640	20	.99			
			74LS641	20	1.29			
			74LS644	20	1.29			
			74LS645	20	.99			
			74LS670	16	.99			
			74LS688	20	1.95			
			81LS95	20	1.49			
			81LS96	20	1.49			
			81LS97	20	1.49			
			81LS98	20	1.49			

74S/PROMS*

74S00	14	.29	74S112	16	.49	74S189	16	1.95
74S02	14	.29	74S124	16	2.75	74S194	16	1.49
74S04	14	.35	74S132	14	1.49	74S195	16	1.49
74S05	14	.35	74S133	16	.45	74S196	16	1.49
74S08	14	.35	74S135	16	.89	74S240	20	1.49
74S09	14	.39	74S136	14	1.39	74S241	20	1.49
74S10	14	.29	74S138	16	.79	74S242	14	2.69
74S11	14	.35	74S139	16	.79	74S244	20	1.49
74S15	14	.35	74S140	14	.55	74S251	16	.79
74S20	14	.35	74S151	16	.79	74S253	16	.79
74S22	14	.35	74S153	16	.79	74S257	16	.79
74S30	14	.35	74S157	16	.79	74S258	16	.99
74S32	14	.35	74S158	16	.79	74S273	20	2.39
74S37	14	.69	74S175	16	.79	74S280	14	1.89
74S38	14	.69	74S181	24	4.95	74S287*	16	1.69
74S64	14	.39	74S189	16	3.95	74S288*	16	1.69
74S65	14	.39	74S194	16	.79	74S299	20	3.95
74S74	14	.49	74S195	16	.79	74S373	20	1.69
74S85	16	1.49	74S196	16	.79	74S374	20	1.69
74S86	14	.35	74S288*	16	1.75	74S472*	20	3.49

74ALS.

74ALS00	14	.35	74ALS32	14	.39	74ALS174	16	.89
74ALS02	14	.35	74ALS74	14	.55	74ALS175	16	.89
74ALS04	14	.39	74ALS109	16	.55	74ALS240	20	1.79
74ALS05	14	.39	74ALS112	16	.79	74ALS244	20	1.79
74ALS08	14	.35	74ALS138	16	.89	74ALS245	20	2.49
74ALS10	14	.35				74ALS373	20	1.95
74ALS27	14	.39				74ALS374	20	1.95
74ALS30	14	.35				74ALS573	20	1.95

74F

74F00	14	.59	74F138	16	1.19	74F241	20	2.49
74F02	14	.59	74F139	16	1.29	74F244	20	2.49
74F04	14	.65	74F157	16	1.29	74F251	16	1.49
74F08	14	.59	74F158	16	1.29	74F253	16	1.79
74F10	14	.59	74F193	16	4.95	74F257	16	1.39
74F32	14	.65	74F240	20	2.49	74F373	20	2.95
74F74	14	.69				74F374	20	2.95
74F86	14	.89				74F379	16	2.19
74F109	16	.89						

CD—CMOS

CD4000	14	.19	CD4043	16	.69	CD40103	16	2.95
CD4001	14	.19	CD4044	16	.69	CD4503	16	.49
CD4002	14	.25	CD4046	16	.69	CD4508	24	1.45
CD4006	14	.69	CD4047	14	.89	CD4510	16	.69
CD4007	14	.25	CD4048	16	.59	CD4511	16	.69
CD4008	16	.89	CD4049	16	.29	CD4512	16	.69
CD4009	16	.39	CD4050	16	.29	CD4514	24	.99
CD4010	16	.39	CD4051	16	.65	CD4515	24	1.39
CD4011	14	.19	CD4052	16	.65	CD4516	16	.79
CD4012	14	.25	CD4053	16	.65	CD4518	16	.79
CD4013	14	.35	CD4056	16	2.19	CD4519	16	.39
CD4014	16	.69	CD4059	24	3.49	CD4520	16	.79
CD4015	16	.25	CD4060	16	.89	CD4522	16	.79
CD4016	14	.29	CD4066	14	.29	CD4526	16	.79
CD4017	16	.49	CD4068	14	.29	CD4528	16	.79
CD4018	16	.69	CD4069	14	.25	CD4529	16	1.49
CD4019	16	.39	CD4070	14	.29	CD4531	16	.89
CD4020	16	.59	CD4071	14	.25	CD4538	16	.89
CD4021	16	.69	CD4073	14	.25	CD4541	14	.89
CD4022	16	.69	CD4075	14	.25	CD4543	16	.99
CD4023	14	.25	CD4076	16	.89	CD4553	16	4.95
CD4024	14	.49	CD4077	14	.29	CD4555	16	.89
CD4025	14	.25	CD4078	14	.29	CD4556	16	.89
CD4026	16	1.49	CD4081	14	.25	CD4560	16	3.95
CD4027	16	.39	CD4082	14	.25	CD4566	16	1.95
CD4028	16	.65	CD4085	14	.29	CD4583	16	1.19
CD4029	16	.65	CD4086	14	.29	CD4584	14	.59
CD4030	14	.39	CD4093	14	.39	CD4585	16	.75
CD4034	24	1.39	CD4094	16	1.49	CD4723	16	1.19
CD4035	16	.85	CD4098	16	1.49	CD4724	16	1.19
CD4040	16	.65	CD4099	16	1.39	MC14411	24	9.95
CD4041	14	.75				MC14490P	16	4.49
CD4042	16	.59				MC14572	16	.89

SPECIAL!! SPECIAL!! SPECIAL!!



MC68701 — Microcomputer with EPROM

The MC68701 is an 8-bit single chip microcomputer unit (MCU) which significantly enhances the capabilities of the MC6800 family of parts. On-chip resources include 2048 bytes of EPROM, 128 bytes of RAM, Serial Communications Interface (SCI), parallel I/O, and a three function Programmable Timer.

MC68701. . . . . $24.95

CUSTOM COMMODORE CHIPS
for VIC-20, C-64 and C-128 Personal Computers

Part No.	Description	Price	Part No.	Description	Price	Part No.	Description	Price
*6510	CPU. . . .	$19.95	*6526	CIA.	$25.95	*6581	SID . .	$32.95
*6525	TPI.	$20.95	*6560	VIC-I. . . .	$29.95	82S100PLA	PLA . .	$37.95
*SPECS. AVAILABLE @ $1.50 EA.			*6567	VIC-II. . . .	$44.95	NOTE: 82S100 = U17 (C-64)		

MICROPROCESSOR COMPONENTS

MICROPROCESSOR CHIPS

Part No.	Pins	Function	Price
D765AC	40	Floppy Disk Controller	4.95
CDP1802CE	40	CPU 2.5MHz	9.95
2661-3	28	Enhanced Prog. Comm. Interface	6.95
D3242	28	Addr. Multiplexer & Refresh Counter	6.95

Z80, Z80A, Z80B, SERIES

Z80	40	CPU (MK3880N-4)(Z80C) 2.5MHz	1.75
Z80-CTC	28	Counter Timer Circuit	1.79
Z80-DART	40	Dual Asynchronous Rec./Trans.	4.95
Z80-DMA	40	Direct Memory Access Circuit	4.95
Z80-P10	40	Parallel I/O Interface Controller	1.79
Z80-S10/0	40	Serial I/O (TxCB and RxCB Bonded)	4.95
Z80-S10/1	40	Serial I/O (Lacks DTRB)	4.95
Z80-S10/2	40	Serial I/O (Lacks SYNCB)	4.95
Z80-S10/9	40	Serial I/O.	4.95
Z80A	40	CPU(MK3880N-4)(Z80C-1)4MHz	1.85
Z80A-CTC	28	Counter Timer Circuit	1.89
Z80A-DART	40	Dual Asynchronous Rec./Trans.	5.25
Z80A-DMA	40	Direct Memory Access Circuit	5.95
Z80A-P10	40	Parallel I/O Interface Controller	1.95
Z80A-S10/0	40	Serial I/O (TxCB and RxCB Bonded)	5.25
Z80A-S10/1	40	Serial I/O (Lacks DTRB)	5.25
Z80A-S10/2	40	Serial I/O (Lacks SYNCB)	5.25
Z80A-S10/9	40	Serial I/O.	5.25
Z80B	40	CPU (MK3880N-6) 6MHz	3.95
Z80B-CTC	28	Counter Timer Circuit	4.95
Z80B-DART	40	Dual Asynchronous Rec./Trans.	6.95
Z80B-P10	40	Parallel I/O Interface Controller	4.95
Z80B-SIO/0	40	Ser.I/O (TxCB & RxCB Bond.) (MK3884-6)	12.95
Z80B-SIO/1	40	Serial I/O (Lacks DTRB)	12.85
Z80B-SIO/2	40	Serial I/O (Lacks SYNCB)	12.79

6500/6800/68000 SERIES

6502	40	MPU with Clock (1MHz)	2.75
6502A	40	MPU with Clock (2MHz)	2.95
6502B	40	MPU with Clock (3MHz)	6.95
6520	40	Peripheral Inter. Adapter	2.95
6522	40	Versatile Inter. Adapter	4.95
6545	40	CRT Controller (CRTC)	4.95
6551	28	Async. Comm. Interface Adapt.	6.95
6800	40	MPU	1.95
6802	40	MPU with Clock and RAM	4.95
6809	40	CPU — 8-Bit (On-Chip Oscillator)	5.75
6809E	40	CPU — 8-Bit (External Clocking)	5.95
68B09E	40	CPU — 8-Bit (Ext. Clocking) 2MHz	7.25
6810	24	128x8 Static RAM	1.95
68B10	24	128x8 Static RAM (2MHz)	3.49
6821	40	Peripheral Inter.Adapt.(MC6820)	1.95
68B21	40	Peripheral Interface Adapter (2MHz)	3.95
6840	28	Programmable Timer	6.75
6843	40	Programmable Floppy Disk Controller	19.95
6845	40	CRT Controller (CRTC)	4.95
68B45	40	CRT Controller (CRTC) 2MHz	6.95
6850	24	Asynchronous Comm. Adapter	1.95
6852	24	Synchronous Serial Data Adapter	4.75
6860	24	0-600bps Digital MODEM	7.95
68000L8	64	MPU 16-Bit (8MHz)	9.95
68488P	40	General Purpose Int. Adapter	14.95
68661	28	Enhanced Prog. Comm. Interface (2661)	8.95
68701	40	Microcomputer with EPROM	24.95

8000/80000 SERIES

8031	40	Control Oriented CPU w/RAM & I/O	6.95
8035	40	MPU — 8-Bit	1.95
8039	40	CPU—Sgl. Chip 8-Bit (128bts. RAM)	2.75
8060	40	CPU — 8-Bit NMOS	14.95
8073N	40	CPU w/Basic Micro Interpreter	29.95
8080A	40	CPU	3.95
8085A	40	CPU	2.75
8085A-2	40	CPU-8-Bit N-Channel(5MHz)	4.95
8086-2	40	CPU 16-bit 8MHz	8.95
8087	40	Arithmetic Processor (5MHz)	129.95
8087-2	40	Arithmetic Processor	139.95
8088	40	CPU 8/16-Bit	7.95
8116	18	Dual Baud Rate Generator	8.95
8155	40	HMOS RAM I/O Port-Timer	2.75
8156	40	RAM with I/O Port and Timer	2.75
8202	40	Dynamic RAM Controller	9.95
8203	40	64K Dynamic RAM Controller	29.95
8205	16	Hi Speed 1 out of 8 Binary Decoder	3.29
8212	24	8-Bit Input/Output (74S412)	1.95
8224	16	Clock Generator/Drver	2.25
8228	28	Sys. Cont./Bus Drver (74S428)	3.49
8237-5	40	High Perf. Prog. DMA Cont. (5MHz)	6.95
8238	28	System Controller (74S438)	4.29
8243	24	I/O Expander for 48 Series	2.49
8250A	40	Async. Comm. Element	6.95
8250B	40	ACE (IBM PC or XT Software Compatible)	5.95
8251	28	Prog. Comm. I/O (USART)	1.95
8251A	28	Prog. Comm. Interface (USART)	2.25
8253-5	24	Programmable Interval Timer	2.25
8254	24	Programmable Interval Timer	9.95
8255	40	Prog. Peripheral I/O (PPI)	1.95
8255A-5	40	Prog. Peripheral I/O (PPI) 5MHz	2.25
8257-5	40	Prog. DMA Controller	2.49
8259	28	Prog. Interrupt Control	2.25
8259-5	28	Prog. Interrupt Controller	2.49
8272	40	Sgle/Dble Density Floppy Disk Cont.	4.95
8274	40	Multi-Protocol Serial Cont. (7201)	14.95
8275	40	Prog. CRT Controller	14.95
8279	40	Prog. Keyboard/Display Interface	2.49
8279-5	40	Prog. Keyboard/Display Interface	2.95
8282	20	Octal Latch	3.95
8284	18	Clock Generator/Drver	2.95
8286	20	Octal Bus Transceiver	3.95
8287	20	Octal Bus. Transceiver (Inverted)	3.95
8288	20	Bus Controller	4.95
8289	20	Bus Arbiter	14.95
8741	40	8-Bit Univ. Peripheral Interface	8.95
8748	40	HMOS EPROM MPU	7.95
8749	40	MPU 8-Bit (EPROM Version of 8049)	9.95
8751	40	CPU w/4Kx8 EPROM & 128x8 RAM	29.95
8755	40	16K EPROM with I/O	14.95
80186	68	High Integration 16-Bit MPU	49.95
80188	68	High Integra. 16-Bit MPU (8-Bit Data Bus)	49.95
80287	40	Numeric Processor Ext.	229.95

DYNAMIC RAMS

Part No.	Pins	Function		Price
1103	18	1024x1	(300ns)	.69
4027	16	4096x1	(250ns)	.89
4116N-15	16	16,384x1	(150ns)	.45
4116N-20	16	16,384x1	(200ns)	.39
4128	16	131,072x1	(200ns)	4.95
4164N-150	16	65,536x1	(150ns)	.89
4164N-200	16	65,536x1	(200ns)	.79
TMS4416-12	18	16,384x4	(120ns)	4.95
MM5261	18	1024x1	(300ns)	.25
MM5262	22	2048x1	(365ns)	.25
MM5270	18	4096x1	(250ns)	1.95
MM5280	22	4096x1	(200ns) 2107	1.95
MM5298-3	16	8192x1	(200ns)	.19
8118	16	16,384x1	(120ns)(+5V Only Req.)	1.95
41256-150	16	262,144x1	(150ns)	3.29
41256-200	16	262,144x1	(200ns)	3.19
50464-15	18	65,536x4	(150ns)(41254)(41464)	7.95

STATIC RAMS

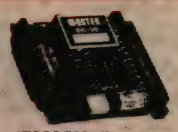
TMM2016-12	24	2048x8	(120ns)	1.69
2101	22	256x4	(450ns) 8101	1.95
2102	16	1024x1	(350ns)	.89
2102-2L	16	1024x1	(250ns) L.P. (91L02)	1.49
2111	18	256x4	(450ns) 8111	2.49
2112	16	256x4	(450ns) MOS	2.49
2114N	18	1024x4	(450ns)	.99
2114N-L	18	1024x4	(450ns) L.P.	1.09
2114N-2	18	1024x4	(200ns)	1.05
2114N-2L	18	1024x4	(200ns) L.P.	1.49
21C14	18	1024x4	(200ns) (CMOS)	.49
2116N-25L	24	2048x8	(250ns) L.P. NMOS	3.49
2125A	16	1024x1	(45ns) High Speed	2.95
2147HN	18	4096x1	(70ns)	3.95
2148NN	18	1024x4	(70ns)	4.29
2149	18	1024x4	(45ns)	4.95
27LS00	16	256x1	(80ns) L.P.	2.95
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MM5257	18	4096x1	(450ns) 4044	2.95
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HM6116P-4	24	2048x8	(200ns) CMOS	1.69
HM6116LP-4	24	2048x8	(200ns) L.P. CMOS	1.75
HM6264P-12	28	8192x8	(120ns) CMOS	4.69
HM6264LP-12	28	8192x8	(120ns) L.P. CMOS	4.79
HM6264P-15	28	8192x8	(150ns) CMOS	4.49
HM6264LP-15	28	8192x8	(150ns) L.P. CMOS	4.59
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2732A-25	24	4096x8	(250ns) 21V.	2.95
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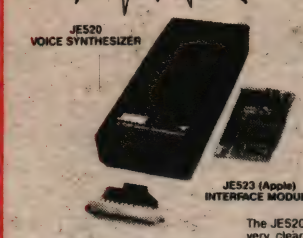
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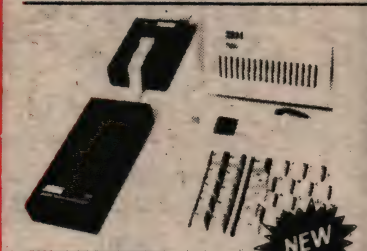
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JE520AP	Voice Synthesizer for Apple II, II+ or *IIe* (Includes JE523 Interface Module).	$119.95
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- **CP/M Compatible**
- **Power ON indicator**
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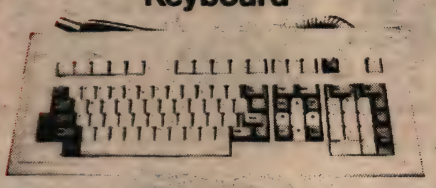
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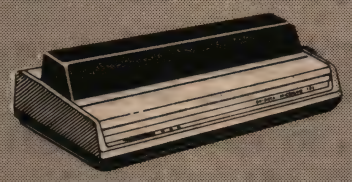
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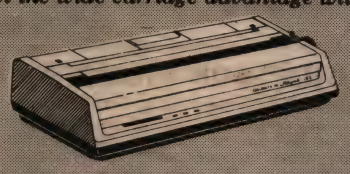
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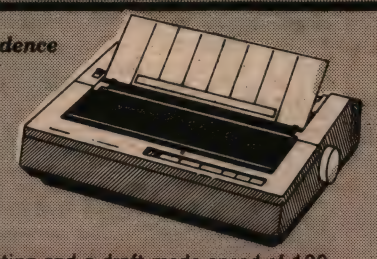
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Universal Sorting Modules for Basic Programs

by Frank Dutton

Writing a sorting procedure for a specific BASIC program every time one is needed can be quite time consuming as well as frustrating when trying to de-bug it. With this thought in mind, the following three sorting modules were created to be able to act universally in BASIC programs with only relatively minor and simple subroutines being written by the user to accommodate the module to any given program. Depending on the types and lengths of files being sorted as well as their tendency to remain in some relative state of a sorted condition, different types of sorts work with varying degrees of effectiveness; this is the reason for three separate and different sort modules. In a given instance the user may wish to try more than one sort and determine which is more effective for the purpose at hand before deciding on one to be a permanent part of the program. The line numbers on the various sort programs are such that the programs can be located at or near the end of their host program without renumbering the lines. As each requires certain user written subroutines to accompany it, examples of the required subroutines are also furnished and include techniques pertinent to converting the data for proper sorting with these modules. All of the sorts will require that sufficient disk space be available for a copy of the existing file to be sorted, viz. if the file to sort is 10Kb, there must be AT LEAST 10Kb of additional open space on the disk.

This programming has been written on a Zenith Z-150 (IBM compatible) in GW-BASIC. The author has not encountered any problems running programs written this way on MS-DOS 1.25 or MS/PC-DOS. These have also been tried out on a Sanyo MBC-1150 under the CP/M operating system using a Microsoft BASIC. The modifications necessary to run the programming under the latter are noted for those users who may wish to use these with a CP/M system. Conversions for other computers and operating systems should be little trouble so long as the BASIC language is Microsoft or compatible. As some BASICs, particularly on CP/M systems, recognize only the first two characters of a variable name, all of the variables used in the various sort modules are non-ambiguous within the first two characters and should work without modification on any BASIC. There will be duplication of variable names between the three modules and the associated example subroutines, but not within any individual module. All variables used in the sort modules are prefixed with the character "S" to specifically identify them as belonging with the sort routines; it is recommended that other variables beginning with "S" not be used within the host program, for purposes of clarity. Other modifications which may be required for some systems will be on lines with LOCATE statements where the coordinates will have to be reversed. In the program listings which follow all LOCATE statements have the ROW position first, followed by the COLUMN position. Also, the BASIC functions POS (current cursor position) and FRE (amount of available RAM memory) are used and in this programming are followed by dummy arguments [e.g. POS(Z)]; for some BASICs these arguments [e.g. (Z)] must be removed to avoid an error condition. On some systems the LOF (n) function will return the number of bytes occupied by the file (the present program listings assume this situation) while on others the number returned may be the number of records of a default length (e.g. 128 bytes). If the latter is the case, the computation of the number of active records in file (as illustrated in some example subroutines) will have to be modified [e.g. SFILELEN% = (LOF(1)*128)/RecLength%] to convert the number returned to bytes rather than records so it can accurately be divided by actual record length. No other exotic commands are used (e.g. graphics) which should cause any significant problems from any one Microsoft BASIC version to another. A great deal of programming space will be saved if the blocks of REM statements are removed prior to insertion of any of these routines into a host program.

The Quicksort module operates by reading the file to be sorted and extracting the data which is to be used as a sort key and concatenating it into a single string and storing these various strings in a file named "SSORT.$$$" in the same order as the original data file. The actual sorting is then performed upon the file of sort key data. An array named SNewOrder tracks the original record number (as the array data) and the record number as it should be in a sorted file (as the array element number). When the sort is completed the file to be sorted is copied, record by record, using the SNewOrder% array, to a new file in the proper sorted order. The original file is not destroyed and the final sorted file is named SSORT.$$$ as the sort procedure finishes and returns to the host program. The actual method of sorting used in the Quicksort is to read the first record of the file to be sorted (SSORT.$$$) and place that record in its proper place in the SNewOrder% array in relation to all other data items. At the same time the file is divided by this data item into left and right (nominal) halves. If there are more than two records in the left "half" they are similarly sorted and that side divided. The process continues until a left side is completely sorted; then the corresponding right side to that left side is sorted. As each section is sorted the sort moves up a "level" to get the next pair of left and right "halves" sorted until the whole of the file is sorted.

The mechanics of extracting the sort key data and using an array for the ordering of the sort are about the same for the merge sort routine. The merge sort can be quite a bit faster for those files which may be in a relative state of order a large portion of the time. With the quick sort it is necessary to have an available amount of disk space at least equal to the file being sorted; with the merge sort, depending on the length of the sort key being used, the required free disk space for sorting can be as much as double the size of the file to be sorted. After the file of sort key data is constructed it is read and sorted to two other files (SSORT-1.$$$ and SSORT-2.$$$). Each record is read and, if it is in the proper sequence with relation to the previous record (e.g. it is larger for an ascending sort) it is written to the sort file behind the previous record. When a record is found to be out of sequence it begins a new "run" of records written to the opposite sort file; the process continues reversing itself until all records are written to the two sort files. The two sort files are then merged,

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A Useful Equation Processor: Review of Formula/One, MSDOS Software

by Michael W. Ecker, PhD

Although it bears the name you'd expect of a racecar, Formula/One is a serious tool for solving and using equations, particularly for engineers, scientists and possibly even pure & applied mathematicians. Before you groan, realize that you can do many things with this package, and not just advanced mathematics, just as you can with a spreadsheet. Of course, I don't know yet whether I'd consider this product as versatile as a spreadsheet. Still, you can do down-to-earth things such as finances (compound interest, mortgages and loan amortizations, etc.) as well as you can deal with more advanced number crunching. Indeed, the software comes with sample files (analogous to spreadsheet templates), one or two of which involve finance.

In terms of your use of One, you can use it by itself, as I did, or alternatively, you may use one of the included utilities to read Lotus 1-2-3 .WKS worksheets for processing of them. In this review, I'll focus on the former only.

I tested my review copy of Formula/One on four computers: an IBM PC XT with 512K, a Sanyo 555 with 256K and the video board, a Tandy 1000 with only 128K and later on my new Tandy 1000 with 256K, and a single-drive Datavue 25, 640K RAM portable computer by Quadram. I found that neither the Sanyo nor the 128K Tandy would load the program. I spoke with the people at Alloy Computer Products and found that incompatibility was the culprit for the Sanyo, an IBM semi-compatible. This was no great surprise. As for the Tandy 1000, 128K was not enough. The company advised me that 192K or 256K would be needed. Having tested it on my recently purchased 256K Tandy, I can confirm that the problem is indeed simply a question of memory for this IBM-compatible machine.

Formula/One loads from the DOS Ready level by typing ONE with the Formula/One disk in drive A. For the IBM the program loads directly. For the Tandy 1000, you need to reinsert the DOS disk in drive A when so prompted, then reinsert the Formula/One disk when so prompted again. The solution I discovered is to copy the Command.Com file from your Tandy 1000's MSDOS 2.11 disk to the Formula/One disk. Unfortunately, there is not enough room, so the only way to do so would be to kill some files, notably the tutorial and/or demo files, preferably from a backup.

In either case, after loading, a dual sheet, opening split screen appears. You use the upper sheet to input equations in free form. As long as your equations are syntactically correct (i.e. meaningful) and fit a few rules, you are pretty free to do as you please. The lower screen displays the variables involved automatically, and both have status indicators to indicate such items as guess value, input value, output value, equation solved, and so on. You can move about each sheet, scrolling as needed, with the cursor keys. To jump to the other sheet, press the ";" key, as indicated on the tiny menu

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Universal Sorting
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in proper sequence of records, back to a single file. The process is repeated until all records are in the final sorted order. At this time the array is assigned with the proper record numbers for the sorting of the original data file and, as with the other sort modules, a sorted copy of the original file is produced and it is left undisturbed.

The third and final sorting module, a priority queue sort, begins much the same as the first two by concatenating a sort key and writing this key to a file to be sorted. This module then determines the amount of free memory available [FRE(Z)] and utilizes most of it to do sorting within memory to minimize disk access. The file is divided into a number of segments and the lowest record in each segment (highest record when doing descending sort) is selected and put into memory. If there is sufficient memory, the entire file may go into memory at one time. The lowest record in memory is then selected; a replacement record is found to go into memory by again searching the specific segment of the file from which the lowest record in memory was chosen and the process is repeated. When all records of a given segment have been put into memory, that segment is "dead" and records may no longer be selected from it. Under some circumstances this sort will far outperform the other two.

All three of the sort modules include routines which clear the screen and display a report of the status and current activity of the sort procedure (e.g. number of records to sort, number currently sorted).

Implementing The Quicksort

MODIFICATIONS: The most common modifications which may be necessary for this module involve the FRE, POS, and LOCATE statements which appear in lines 62110, 62116, 62194. The calculation for the number of records in file as used in the "Open & field file to be sorted" subroutine(s) may require a change such as "SFILELEN% = (LOF(1)*128)/RL%" to convert the number returned by LOF from number of 128 byte (default) records to the actual number of bytes used by the file.

Implementing The Merge Sort

MODIFICATIONS: Modifications similar to those described for the quick sort will be needed with this sort, also. Lines 63108, 63116 and 63210 contain statements which may need revision.

Implementing The Priority Queue Sort

MODIFICATIONS: Modifications similar to those described for the quick sort will be needed for this sort, also. Lines 64104, 64110, 64116, 64176 contain statements which may need revision.

These are the most common modifications which may be needed, but not necessarily the only ones, depending on the system on which the programming is to be implemented.

VARIABLES TO SET BEFORE GOSUB TO MODULE: Prior to executing a GOSUB to any sort routine it is necessary to have the host program set three variables. SBYTES% must be set to the length of the data string which contains the sort keys. [NOTE: Numeric data will almost certainly have a different length in the string of sort key data than it occupies in the file to be sorted. Numeric data is typically stored in random access files in 2, 4, or 8 bit binary strings but for proper sorting it must be converted to longer strings and properly set into the strings for comparison purposes (refer to example subroutine for line 59100).] SFILELEN% must be set to the number of records in the file to be sorted. This is easily accomplished if a subroutine similar to the example in 59000 is used, where the actual number of records in file is determined when the file is opened, and a GOSUB 59000 performed immediately prior to calling the sort subroutine. SPROCEDURE% must have a value of either "0" to indicate a reverse (descending) sort or a "1" to indicate a normal (ascending) sort prior to entering the sort subroutine.

ERROR CHECKS BY THE SORT MODULE: The sort modules check, within the first few lines, certain items which could cause errors if not correctly set and reports any discrepancies to the user if any are found and then returns to the host program without any sort being undertaken if the tests are not met. There is a check for a value being present for SBYTES%, SPROCEDURE% and a value between 3 and 32767 for SFILELEN%. The amount of available RAM is checked using SUNUSED% and a calculation is made of the amount of memory needed by the arrays and variables within the subroutine; if there is apparently not sufficient free memory available the subroutine is aborted and returns to the host program.

ERASING ARRAYS: After the sort routine has been called, performed and returned to the host program the ERASE statement should be executed to free memory space and because it must be implemented prior to calling the sort subroutine again as these arrays are DIMensioned within the subroutine each time it is called. The REM statements preceding each sort module remind the user which arrays must be erased for that particular module.

FILE MAINTENANCE: As a safety precaution, these modules do not destroy or modify the original file which was to be sorted; it is maintained in its original state. A file named "SSORT.$$$" is created by the subroutine and contains a copy of the original data in a properly sorted form. It is up to the host program to destory the original file (if desired) and rename the final sorted version of the file as desired.

USER WRITTEN SUBROUTINES: The user must write four subroutines to appear in the host program and interface with these sort modules. Any given set of subroutines will work equally well, interchangeably, with any/all of the sort modules. Depending on the application, they can be quite simple or may get complex. Examples are furnished in the program listing of intermediate subroutines and explanation is made of ways to modify each for more complex sorts. The subroutines must appear at the line numbers specified.

61000 OPEN AND FIELD FILE TO BE SORTED: The file which is to be sorted must be opened and fielded using buffer #1. In the example subroutines the actual length of the file is also determined. After calculating the length of the file by taking the number of bytes occupied and dividing by the actual number of bytes per record (Line 59006), the final record in the file is read and checked to see if it is an active record (Line 59010) and, if it is not, the record count is diminished by one and the procedure tried again (Line 59012). This ensures that the sort procedure sorts and rewrites to a sorted file only those records which actually exist and does not include some dead space which may be present at the end of the area allocated for the file on disk.

61500 OPEN AND FIELD FILE TO WRITE SORTED RECORDS TO: This procedure opens a file named "SSORT.$$$" and fields it exactly as the file to be sorted is fielded and must use buffer #2. The fields must be like those in the file to be sorted (Subroutine at 61000) but the field names must be at least somewhat different. Since this is a new file to be written it is not necessary to do anything but open and field the file.

61600 WRITE DATA TO BUFFER FOR NEW FILE: When writing the sorted data file to disk under the name "SSORT.$$$" the program will first read a record from the original file to be sorted; next, this subroutine will be called to set the data read from buffer #1 (original file) to buffer #2 (the final, sorted file). The subroutine consists only of the appropriate LSET statements as illustrated by the examples.

61100 CONSTRUCT CONCATENATED SORT KEY STRING: This subroutine is used early in the sort module. The original data file is opened and a second file ("SSORT.$$$") is also opened using buffer #2. (NOTE: Although the file name is the same, this file is not to be confused with the final sorted file which is output later by the procedure, after this file has been KILLed, under the same

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A Useful Equation
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at the bottom of the screen.

Every reader is surely familiar, at least to some small extent, with programming languages. In Basic, for instance, you can assign Y = 5*X + 3, let X = 4, and have your computer print the value of Y (which, in this case, would be 23). However, you cannot get Basic - or Pascal or just about any programming language (except maybe Lisp?), to allow you to input the value of Y and recover - i.e. solve for - the value of X. Hence, where languages allow calculation of only explicitly defined variables, Formula/One goes much further and allows you to find the values of implicitly defined ones. That, plus the free form in which equations are entered, make this powerful package, particularly with all the other sheets available for various lists, tables, calculus-level mathematics and regression analysis.

As an example, say you wanted to find the values of X and Y satisfying X + Y = 10 and 1/X + 1/Y = 2. You enter these equations in the upper sheet. You can correct errors via the backspace key and/or cursor keys if you make a mistake, and editing is intuitive enough to facilitate changes. When you are ready to solve, press the "!" key, or just the F9 function key. Formula/One will attempt to solve directly, much as you or I might in some cases. In other cases, iteration schemes (Newton's method is an example) are used to converge to a solution. As with all computer use, you have to know what you are doing to get meaningful results. Are there other solutions? If so, what kind of suggested guess should you supply to the variable sheet to assist the computer? Such concerns mean that this tool will not permit you to be totally ignorant of mathematics and the underlying ideas. If you are reasonably comfortable, however, then you will have little difficulty and will appreciate a certain charm in the easy manner in which One operates.

Although I never reviewed TK! Solver, another equation-processing package, I know enough of that product to know that Formula/One is closely patterned after it, a point which I confirmed with Alloy Computer Products, the producer. Indeed, at $395, or $95 more than TK! Solver (now a Lotus property), Formula/One is supposed to embody improvements.

The manual is of the three-ring binder type and comes with three disks. The manual's contents are nicely done, with care taken to get even a novice started in loading the program. Although I found one mathematical error on one of the first pages of the manual (about which I notified Alloy and was advised my correction would be incorporated in future errata sheets), for the most part I found the manual helpful and clear, as well as literate (how refreshing!). The disk for use with Lotus comes unprotected, but the master disks are protected, which is why you are given two. I found that Central Point Software's COPYIIPC enabled me to backup the disks for my archival purposes, however. Moreover, a company spokesperson advised me that the copy protection was being dropped. In addition to the usual concern about copy protection, Tandy 1000 users can therefore now copy Command.Com and afford to erase a few files on a backup disk.

While this precis just scratches the surface of this package, all in all I am impressed with it. True, equations with many solutions are sensitive to initial guesses, but such is true of all iteration schemes, whether done by machine or human. I found, in general, that the amount I could wring from the program was directly proportional to the time I put into it. With a tutorial included on disk, with a nice loan amortization and some other examples included, the basics came quickly.

At $395, and with Formula/One's structure being what it is, the program is not for everyone in the same sense as a Lotus 1-2-3. But, for those who employ non-trivial mathematics regularly, it is an excellent tool for the jobs it is designed to handle. ●

COMMODORE

Hands ON! (Guided Tour of a "Real Live" Amiga)

by Ted Drude

Production Amigas Spotted (and Touched)!

"Real live" Amigas are here! I had my first "hands on" experience with a production Amiga in late October. Some aquaintances from a local Commodore User Group (Waterloo Area Commodore Club - WACC), invited me over for a friendly look at their new Amiga, which was purchased from a real Amiga dealer; Computertrend in Des Moines, IA.

After having personal contact with the Amiga I can say that it's definitely for real!. It does everything the pre-release hype said it would. Fantastic color graphics, fast speed, sophisticated DOS, Macintosh-like user interface, fairly nice keyboard, and lots of mysterious hardware and software begging to be explored.

I want to say up front that Commodore has confounded their skeptics, which included me. I didn't think they would ship more than a handful of Amigas before the end of the year. Well, it appears they've shipped a lot more than that. The local Computertrend said they've already sold 65 machines (in under a month) and are on their third shipment from Commodore! My hat's off. Commodore deserves a pat on the back.

Unfortunately, at this point, the Amiga has some weak spots fron its "rushed" introduction. The lack of useful programming documentation for the Amiga is a case in point. Another problem is little or no software for average users (and many developers). In time, these problems will be rectified, but for now, they can be frustrating for someone who's just shelled out two grand or so for an Amiga.

Software to Go... (and go and go...)

Right now, all you get with a standard Amiga is the "bare bones" system software. This includes "KickStart," AmigaDOS and Intuition/ Workbench, a BASIC interpreter (ABasiC), and some graphics demos. MicroSoft BASIC was supposed to be shipped with the Amiga, but it wasn't done in time. Commodore is supposedly going to supply it to early purchasers of the Amiga when it becomes available. Four disks are included with the current system.

"KickStart" - Getting the Amiga Ready to Run

One disk (appropriately named "KickStart"), has to be loaded right after the machine is turned on. The screen displays a helpful little graphic that reminds you to do this when "cold-booting" the computer. This disk loads in the lowest level of the operating system. (This is officially called the "Exec" software.) This level of software controls the physical devices and the interrupts for multi-tasking. The booting of 192K of initial code takes a little while. I didn't time it, but it seemed like 30-40 seconds, maybe less. Later Amigas will have all this code in ROM, ready on power-up.

The early versions of the Amiga actually have 512K of RAM in them as they come from the factory. But only 256K of it is usable for AmigaDOS and your programs. The other 256K is dedicated to the "Exec" operating system. 192K of "Exec" RAM is set up as a ROM emulator at the high end of memory. That is, code is booted in from the "KickStart" disk, to RAM, and then it's switched so that it becomes "write only." Commodore calls this "writeable store" or something like that. It's just a fancy term for a ROM emulator. There is 64K of unused "Exec" RAM appears to be "unusable for normal programming" at this time. You may have to resort to Assembly Language to get at it.

Unless a major system "crash" occurs, or the power is shut off, the "KickStart" disk only has to be booted once at each power up. You can tell when a major system crash occurs because the screen clears and you get a red "Guru Meditation" message and a diagnostic number. This is some kind of diagnostic message that must be interpreted by a Commodore service tech (...a "guru"?).

Built-in to the "KickStart"/ "Exec" code is a tiny little ML monitor program called "ROM WHACK." To access it, you have to have a terminal connected to the serial port and set to 9600 baud. When the system crashes with a "guru" message, you hit the left mouse button and then you are dumped into "ROM WHACK" on the terminal. This is the same on all Amgias. On the development versions of the Amiga, there is another program called "RAM WHACK" that does a lot more and can be run from the Amiga console. This, like a lot of Amiga software, hasn't been released to the general public yet.

AmigaDOS and Intuition/ Workbench - High Power Food For Your 68000

A second disk, called the "Workbench" disk, includes the actual AmigaDOS and the "Intuition" Icon environment with the "Workbench" AmigaDOS interface. After booting cold with "KickStart," you are prompted to insert the "Workbench" disk to get AmigaDOS up and running. This disk boots fairly quickly, depending on how the Amgia-DOS power up sequences have been configured. Also includ-

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Koronis Rift

by Cheryl Peterson

Koronis Rift is an action arcade game with strategy thrown into it to make it more difficult. There are two scenarios that control the game. In the first, you explore the rifts (mountainous terrain) in search of old abandoned war machines. In the second, your Psytek 7500 Series Droid System Analyzer lets you know exactly what you've found. Because the old technology is fully compatible with newer equipment you own, you can make use of the old modules if you install them.

In your travels as a space junk collector, you've stumbled upon the richest find of all time. A legendary planet that is rife with high quality technological toys. Once a testing ground for the "war toys" of an intergalactic group, Koronis Rift has been only a shadowy legend until you find it. Since these relics from a distant past contain technologically superior weapons that have great value on the open market, you set out to explore the planet and grab everything you can get your hands on.

There are a few obstacles that stand in your way. The high radiation levels left by centuries of uncontrolled testing would fry you in a heartbeat. You must do your exploring with a rover and send a robot to retrieve your finds. If that isn't enough, guardian

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Inside Commodore

by Ted Drude

This month we'll be looking at the C-128 in greater detail, and reviewing one of the best wordprocessors I've ever seen for the C-64.

Hard Disk Update

I want to thank those of you who have written in expressing an interest in the possibility of a hard disk project. There hasn't been quite as much interest as anticipated, apparently because of the projected cost of the project (anywhere from $500-800 for a 10 Meg. drive). We are still going ahead with the project, but will be considering some alternatives that may cost a little less.

One suggestion I received was that we should use IBM-PC type hard disk controllers and drives since they are dropping in price so much. Well, I have explored that possibility. It would require a C-64/128 to IBM-PC bus adapter and the necessary software. You would then buy a PC case and power supply along with a hard disk and controller. The estimate cost of that system, though, would still be over $500. The only difference would be that you could later put a PC board in the case, add a keyboard and have a PC/XT clone for a few hundred dollars.

Another alternative (one I'm leaning toward) is to use a "SASI" interface (for "Shugart Associates Systems Interface") for the controller. If we use the SASI bus, then you would be able to use the most expensive parts of the system (the controller and hard disk) on a wide variety of computers (including the IBM-PC and the Amiga).

If we went this route, you could use your hard disk with a C-64, a C-128, and then eventually an Amiga, if you upgrade. Using the more advanced, SCSI ("Small Computer Systems Interface") bus, you might be able to set up a hard disk as a "file server" in a local area networking arrangement. This means you could have a C-64, a C-128, and an Amiga all hooked up to one hard disk *at the same time* sharing data files together.

So, here is some more fodder for your consideration. Let me know what you think about all this c/o the Shopper. I'll keep you posted on the progress of the project.

Reader Mail - Printers and Print Quality

Here's some info for those of you wanting to use the Centronics parallel driver program with SpeedScript:

Dear Ted,

" ...You indicated a hope to come up with a patch which would allow the driver to be used with SpeedScript 3.0 as published in *Compute!* magazine. This letter is being written with a C-64 connected through your driver to an IBM graphics printer using SpeedScript. I adapted the program and found the problem to be caused by the initialization stages of SpeedScript which pokes blanks into memory all the way up to $CFFF, and consequently overwrites the driver when it is installed in its usual position at $C000. The solution is handled as follows:

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ed as part of this disk are some very simple demo programs.

Operating Environments — With or Without Icons

When booting up AmigaDOS with the factory disk, you find yourself ending up in "Intuition," the icon management systems. Intuition has all kinds of neat icons and features that will be available to programmers who want to incorporate them into their software.

"Workbench" is an integrated part of Intuition. It's the AmigaDOS interface. When operating in the "Intuition/Workbench" Icon based mode (with mouse and pictures), you are insulated from all AmigaDOS commands. Instead you use the mouse to select graphic pictures and click the button. You can select normal DOS commands (like file and disk copy) by using the mouse and "clicking" at icons of disks and files. To run an application program, you merely select it's icon symbol (assuming it has one) and click the mouse. It can be quicker than typing, but a lot of debate goes on over that!

The details of how to use all the neat features of Intuition and Workbench are found in the "Amiga Developer's Intuition Manual." Like a lot of Amiga documentation,...it hasn't been released to the public yet (this is getting ridiculous). Apparently, you load Intuition and Workbench as a package then make system calls to it and "Exec" to handle the graphics and I/O for your programs. (That, by the way, is simply an educated guess. We'll have to wait for Commodore to release the manual for full details.)

You can actually run the Amiga from one of two levels. If you don't like the somewhat limited (but user-friendly) approach of "Workbench," you can escape to a low-level "DOS prompt" environment, similar to CP/M or PC-DOS. To escape to this level, you can use "Workbench" to go to the "CLI" (Command Line Interpreter) program.

Some Shopping With CLI — A "Ton" of AmigaDOS Commands

AmigaDOS is a fantastic, multi-tasking DOS that is a perfect complement to Amiga's great hardware. Unfortunately, all the details on how to use this DOS for programming is found in the (you guessed it) not-yet-released-to-the-public "AmigaDOS Reference Manual." Almost no DOS information whatsoever is provided in the error-laden User's Guide.

For those of you with some technical questions about AmigaDOS, here's a taste of what it's like. Hacker-type perusal of AmgiaDOS using the "CLI" program reveals a heirarchial type file system with tree subdirectories and I/O redirection. It's not unlike PC/MS-DOS and UNIX. In fact, using the CLI program is a lot like running PC-DOS. Many of the commands are the same and have similar syntax. The User's Guide gives you very little info about the DOS commands, but, you can invoke all commands with a "?" after them. At that point, they will print a message that gives you some idea of the syntax they expect.

Most all AmigaDOS commands seem to be external (that is, separate files that reside on the default disk), but I can't totally verify this. A batch programming language is evident (if, endif, else, etc.). File Copy (single or multiple files), Diskcopy (whole disk backup), Directory, List (extended directory), Assign (logical path), and Date commands are available. Other commands, like file attribute, subdirectory management, and file/disk protect utilities, are present.

Multi-tasking is handled through the DOS commands, "Newcli," "Run," "Break," and "Endcli." New CLI windows are opened and then become "Virtual terminals." New processes (called "tasks" in Amiga language) are started in them. The priority of task execution can be set and finished tasks terminated. Finally, the opened CLI windows can be closed and you will "drop down" to the next level window. Apparently, two tasks, a foreground and a background, can be running simultaneously in each CLI window, in addition to the tasks running in other windows.

One of the system utilities provided is a nice little full-screen editor, "ED." You can use it to create batch files, program source code, or to create a custom "Startup-sequence" file that will be executed on boot-up.

Specialized Subdirectories

Most of all the disks have several "standard" subdirectories. These are the "S", "C", "L", and "T" directories. The "S" directory contains an "auto-executing" or boot-up batch file that's named "startup-sequence." This is similar to the "Autoexec.bat" file used in MS-DOS. (This file can be modified or eliminated to cause you to go straight to CLI after booting DOS.) The "C" directory contains all the external DOS commands for that disk. The "L" directory contains "library" files that are apparently (?) used by application programs. The "T" directory is used to store backup files that are created when editing existing text files. One directory on the Workbench disk is called "Trashcan." It appears that everything you "trashcan" while in the Icon environment gets stuffed in the "trashcan" directory so you can later get it back if you desire.

Using the Assign command, you can have different system directories on different drives. For example, one trick is to set up a batch file to copy all the "C" commands from floppy disk to RAMDISK, ASSIGN the "C" directory to RAM, and then remove the boot disk. This allows you to switch disks and run all the DOS commands you want without having to "Place Workbench Disk In Drive One" all the time.

One neat command of DOS is the "Why" command. When one of the cryptic error number messages appears during a DOS run, you can usually type "why" and ask for more info. A more complete, English-like explanation of the error will appear. This saves time that you might spend looking up every error message you encounter. A very similar command, "Fault," allows you to look up the complete error message for any DOS error if you know its "error number."

ABasiC — Very, Very Basic... But at Least It Runs (Sometimes)

A third Amiga disk includes "ABasiC," or Amiga BASIC interpreter. The label on this disk also mentions an "Amiga Tutor" program but it isn't included (yet). ABasiC seems to be a good BASIC interperter. It has excellent graphics handling and even includes voice synthesis. It also has some problems in that it uses a limited line-editor instead of a full screen editor (quite a let-down for Commodore users) and it has some small bugs in it. But, at least Commodore included a programming interface with every machine (which is more than can be said for Apple and its Mac). Some neat programs are starting to appear on Bulletin Boards for the Amiga written in ABasiC, so apparently it does have its uses. It remains to be seen how long it will last when Microsoft BASIC finally becomes available.

The worst part of ABasiC is that the "Amiga's User's Guide," which includes a section detailing ABasiC, is full of errors. Many of the syntax descriptions and examples won't run because of obvious typographical errors. This is a further indication of a rushed introduction for the machine.

Electronic Arts Demos — A (Slight) Taste of Possibilities

A fourth disk that comes with each machine runs a scrolling "slide show" series of still, hi-res, pictures from forthcoming Electronic Arts programs. It gives you some idea of the Amiga's graphics capabilities. One thing that isn't included is the fancy graphics demos you see on the Amiga TV commercials. The "bouncing ball" demo, for example, isn't included. Supposedly, it's for dealers only. Be nice to your dealer, and he may give you a copy to impress your friends with.

Hardware Goodies

I assume you've read some of the pre-release publicity and are familiar with the basic Amiga hardware (68000 processor, 256K RAM, etc). So, I won't reiterate the long list of "tech specs" (if haven't seen them, look at the October issue of the *COMPUTER SHOPPER*). The Amiga seems to have made it into production with all of the pre-release hardware specs intact.

The detached Amiga keyboard is laid out well. I, personally, like the feel of the new keyboard on the C-128 a little better, but the Amiga's is good, too. When you're not using the keyboard, it slides right under the system box, out of the way. The mouse is a two button mouse that's about like every other mouse I've seen or used for the IBM-PC or Mac.

System Box and Disk Drives

The Amiga system box has a small "footprint." It's much smaller than an IBM-PC, but not quite as small as the Macintosh (about like a PCjr). The built-in double sided, 3.5 inch

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Inside Commodore continued from page 55

1. Load the driver into the 64 and SYS 12*4096
2. Load SpeedScript (do not run it yet)
3. In the direct mode enter POKE 2481, 143
4. Save SpeedScript as modified to disk or tape.

"This modification prevents the blanking of memory above $8000 and leaves the driver undisturbed. Printing is accomplished by use of the [SHIFT-CONTROL-P] combination and the entry of "4" and "1" in response to the "device #" and "secondary address" prompts.

"One minor compromise of this solution is that memory available for text is reduced to less than 30,000 bytes, but with the "g"o linked file format command this should not cause serious inconvenience.

"I have found the drive program works well with some other programs, i.e. spreadsheets, etc., if load and activated before loading the program.

Yours Truly,
Russell L. Willis Jr.

A hearty thanks, Russell, for doing the hard work of getting that patch together for us! We need more readers like you! I want to remind everybody that this patch only works on Version #3 of SpeedScript. Versions 1 and 2 require a different POKE than the one mentioned above. I hope to present that info in an upcoming column. Thanks again, Russell, for letting us know about the SpeedScript patch.

Here's another note from a reader:

"... I plan on getting a Commodore 128, 1571 drive and a 1902 monitor.

"...What's your opinion on the Epson Homewriter 10? Is the NLQ (Near Letter Quality) mode suitable for college papers? What is your opinion of my choices? What would your suggestions be? What would you choose as the best magazine for a beginner to subscribe to for articles, programs, and help when needed? What's your opinion of people who ask countless questions?

Thanks,
Barlow G. Hill"

Whew! Well, first, I recommend that you contact the college directly for their direction on whether dot matrix print of any kind is acceptable. Whether the NLQ mode is suitable for college papers or not depends mainly on the school policy, not my opinion. More and more schools, businesses, and institutions are accepting dot matrix printout as acceptable for typewritten requirements. The university I attend as a graduate student accepts dot matrix print for all papers except final thesis and dissertations. So, all you have to do is borrow or rent a daisy wheel (if you can find one), for those papers.

The NLQ modes of most dot matrix printers under $1000 just isn't as good as "quality" you get from a daisy wheel printer for the same price. At the $1000 or higher level, there are several dot matrix printers that begin to have excellent NLQ modes (among them are the Epson LQ-1500 and Toshiba 351). I can get print quality that is almost as good as the Homewriter (maybe better) from my old RX-80 by shifting to double strike and emphasis modes. Using a carbon or multi-strike ribbon also increases readability.

If you decide that a daisy wheel is more suitable, Blue Chip is now selling an inexpensive (under $200) daisy wheel printer that has a built-in

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ATARI

More Jackintosh Adventures

by Fred Hatfield

Bitmap Memory Dumps

Dumping Jackintosh's memory is one way to find out about the system operation. However, the 520ST is a "new" type of computer -- considerably different from what has gone before. Instead of being "text" oriented, the Jackintosh is part of a breed known as "bit-mapped". "Bit-mapped" is a fancy way of saying that the screen display is controlled by individual pixels with representation in memory. In other words, for every pixel on the screen display, there is a corresponding bit in memory that can be "on" or "off." (For simplicity, we'll skip the color concept at the moment.)

If you think about it, that means that any text to be displayed has to be represented by such "bit patterns" in memory, i.e., the letters A, B, C, E, etc. Each will have to be stored in memory and moved to the screen display area as needed. This also means that if you know where the bit patterns are stored, it would be possible to substitute another "typeface" for the existing one. In fact, it would be possible to have a number of substitute typefaces that you could select at will.

Here are two programs that will display bitmap patterns on an EPSON printer. The first one (IDUMP for "Icon Dump") (on page 143) will display sequential memory locations so that you can locate icons. The second program (FDUMP for "Font Dump") (on page 58) will display "interlaced" memory strips to show you the construction of a font. "Interlaced memory strips" will be explained later in this article.

Icon See You're Interested

IDUMP has it's count controls set for a 32x32 bitmap matrix. This is the most

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Atari Help

by Jeff Brenner

Q. The August 1984 issue of *Computer Shopper* included a program for alphabetizing words and then storing and retrieving these words. This program has turned out to be very handy. Is there a way to delete words from the alphabetized list?

John M. Hirsch
Normal, IL

A. There are two easy ways to delete an entry from an alphabetized list. Consider the following string, which represents five words A, B, C, D and E;

WORDS$ = "ABCDE"

Each "word" has its own position in the string; "A" is in position 1, "B" is in position 2, and so forth. Deleting an entry is then a simple matter if you are familiar with the way Atari BASIC handles strings. If you wanted to delete the "B" entry above, for example, the following command would do the trick:

```
LET
WORDS$(2) = WORDS$(3,5)
```

This tells the computer to place in position 2 (where the "B" resides) the entries in positions 3 through 5. Thus, WORDS$ now contains:

"ACDE"

The "B" has been deleted.

A similar procedure can be used to delete an entry in August's alphabetizing program. For example, to delete entry number X, use the following:

```
LET WORDS$(X*20-19) =
WORDS$(X*20+1,LEN(WORDS$)).
```

A more creative technique for deleting an entry in an alphabetized list is to assign the entry to be deleted a string such as "ZZZZZZZZZZ." When the words are realphabetized, the entry with the Z's will be sorted to the bottom of the list where it can be conveniently ignored or discarded.

Q. I am interested in finding any information concerning the ability of expanding the memory on my 800XL Atari. It would be greatly appreciated if you could tell me if this is possible and, if so, who I may purchase these components from to further the use of my system.

Andrew Leo Eddings
Alabaster, AL

A. Over a year ago I recall that Axlon and one other company had been manufacturing a 128K memory expansion for the 800 (although this would not necessarily be compatible with the XL). The extra memory was accessed through bank switching of a 4K address area. I haven't heard anything about it since then, although I can tell you that it would not be compatible with the DOS 2.5 RAMDISK for the 130XE. If any readers produce or know of a 128K memory expansion currently available for the 800XL. Please write and tell us.

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Applying The Atari

by Jeff Brenner

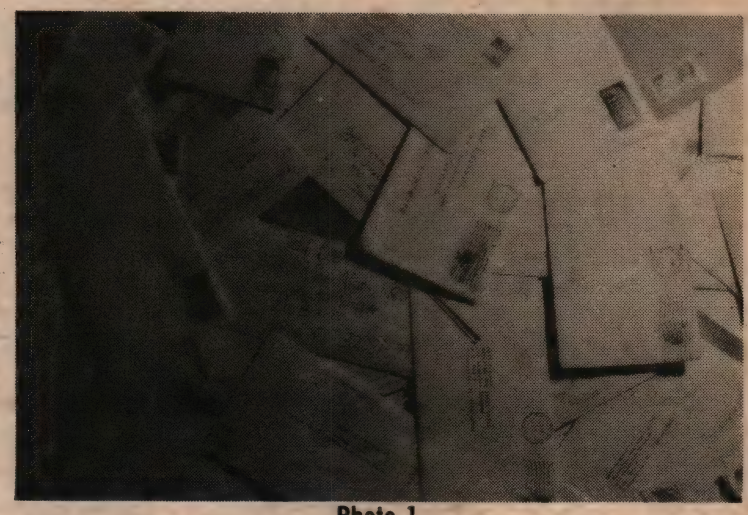


Photo 1

Yes, we've made it to 1986, and what could be a more appropriate way to start the year than with a computerized appointment calendar program? With Pace, the Personal Appointment Calendar & Editor, you'll never have an excuse for missing an appointment again. This month we'll also read some reader mail, look back on 1985, and get a glimpse of some Halley's Comet software available for the Atari.

Retrospect

Surely, 1985 will be remembered for both the Atari ST and the Commodore Amiga, regardless of how well each has sold during this holiday season. As I write this column in November, everybody is talking about the amazing capabilities of the Amiga. Even A.N.A.L.O.G. has acknowledged that many Atari-users consider the Amiga to be the *real* next-generation Atari machine. For those less interested in the Amiga's graphics and sound capabilities, however, most would agree that the Atari 520ST offers comparable performance at a much more affordable price. Maybe everybody should buy *both* machines. Or, how about neither. Many computer-users dislike the notion of upgrading to a new computer when the industry tells them to; i.e. "now's the time to dump that 8-bit antique and get a Mac-like machine." Many 8-bit Atari owners have put a significant investment in their machines in software and hardware, and are less than thrilled about starting over from scratch with a brand new system.

One thing is for certain, though. The prices for software and hardware for the 8-bit line have dropped considerably. Many Atari users have finally been able to expand to fully-equipped Atari systems with disk drives, modems, and more versatile printers. The lower disk drive prices have made the cassette-based Atari system almost extinct.

Well, by 1986 you'll know the score. I'm still hoping to see a true 32-bit, multi-megabyte machine from Atari--maybe they could add some Amiga-rivaling graphics and sound effects while they're at it. We'll have to wait and see what 1986 brings.

Reader Mail

Q. I purchased the first issue ever of *Computer Shopper* in September and came across your Response Analysis Program (9/85, page 59), which I spent 3 and 1/2 hours typing in. I was intrigued with this program and looked forward to demonstrating it to friends and relatives to show that computers can be programmed to simulate artificial intelligence.

After keying it in, it did not work properly. Enclosed I give you a printout showing an example of the responses I get. The program only responds with the statements contained in the last few lines, i.e. 5580 to 5587. It does not pick up on the key words the way it is supposed to. Any suggestions?

H. G. Hittenberg
Toronto, Ont. Canada

A. The printout that H.G. Wittenberg sent me was quite humorous and a portion of it follows:

```
>I WANT TO TALK ABOUT
WORK
RAP: EXPLAIN FURTHER

>WORK - YOU KNOW -
WHERE ONE GOES TO
EARN MONEY
RAP: AND WHAT DO YOU
THINK ABOUT THAT?

>I THINK WORK IS
NECESSARY AND
ENOBLING
RAP: I DON'T
UNDERSTAND

>WELL, YOU ARE NOT
PICKING UP THE KEY
WORD WORK!
RAP: WHAT ELSE SHOULD
I KNOW?
```

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Applying The Atari
continued from page 57

>YOU ARE MAKING ME ANGRY
RAP: YOU SEEM UNCOMFORTABLE WITH THIS TOPIC!

>NO, I AM ANGRY AND MAD THAT YOU DO NOT PICK UP THE KEY WORDS
RAP: TELL ME MORE.

>LOOK UP DATA STATEMENT IN LINE 1280--THAT'S WHERE YOU FIND ANGRY, MAD
RAP: THAT IS INTERESTING--GO ON.

>YOU ARE SUPPOSED TO COME UP WITH RESPONSE IN LINES 5390-5392!
RAP: LET'S HEAR ALL ABOUT IT!

While it may seem that RAP is putting up a good fight with H. Wittenberg, RAP is answering only with its dummy responses, such as "AND WHAT DO YOU THINK ABOUT THAT?" and "TELL ME MORE."

The Response Analysis Program as listed in the September 1985 column, has been thoroughly tested on an Atari 800, 800XL, and 130XE, and will work perfectly if it has been entered correctly. The cause of H. Wittenberg's problem is most definitely a typing error. However, a TRAP statement in the program makes it difficult to spot errors since a faulty program will still run without error messages; the program is directed to give a dummy response whenever an error occurs in the program. Therefore, readers who are not getting proper responses from RAP, should change the TRAP 1190 on line 650 to a TRAP 40000. This disables the trap command and will let the program stop executing when an error occurs.

The best way to check RAP is to type in some lines from the sample conversation provided on page 59 of September's issue. For example, if you type:

I'M CHECKING TO SEE IF YOU WORK PROPERLY.

RAP should give a response such as:

FOR HOW LONG HAVE YOU BEEN CHECKING TO SEE IF I WORK PROPERLY.

If you enter H. Wittenberg's statement, "I WANT TO TALK ABOUT WORK," a properly entered RAP will respond with a response such as:

DO YOU KNOW MANY PEOPLE WHO ENJOY THEIR JOBS?

As I have stressed in the past, the best insurance against typing errors when entering programs from this column is the Program Perfect utility, which uses the three-letter codes preceding each program line to verify lines as they are entered into the computer. See April's column (1985) for a listing of Program Perfect (the instructions are printed in May's column), or readers can purchase a Program Perfect diskette with documentation (see the end of this article).

Q. Regarding the small print in the manual supplied by Optimized Systems Software for their Basic XE cartridge (and presumably for their other products as well). It seems I, with overworked and less than perfect eyesight, trustingly ordered Basic XE by mail. Now, I have no gripe with the product. A recently published benchmark sort took nine minutes on my 130XE. When I plugged in the Basic XE cartridge, just to see what would happen (since I can't read the tiny print in their manual) the same exact benchmark ran in 3:30 flat. This is clearly a powerful product but, alas, I may never get full use of it, despite having paid full price. Oh, I know I could have gotten a refund. That's not the point. I want everything this product can do for me--the full capability I paid for. So, I wrote a strong gripe on the warranty form when I sent it in. The response from OSS to date has been a big round zilch. Ironically, they have other products I'd like and can afford to buy. Will I? Will you?

I've spent many years in marketing and advertising and there's a moral here. The smart marketers today know that it's not enough merely to make the initial sale of complex hardware, software or firmware products. You must support (and keep on selling) every customer after the sale if you want to build your company. The only practical way to do that for sales that doesn't amount to big bucks is by providing manuals that are practical, understandable and readable. In fact, good manuals are powerful marketing tools for high-tech products. We get them from Synapse, from Datasoft and others. Even the tiny "one guy and a bright idea" operators are putting out documentation that's readable, even if they don't spell too well.

Unfortunately, OSS saw a chance to save a few bucks on printing and paper; a decision that may be good finance but is lousy marketing. It cheats every customer who doesn't have the eyes of an eagle. So, watch yourselves, all nearsighted hackers. Caveat emptor is alive and well in the marketplace.

Roy Hutchins
Rochester, NY

A. I'm well aware of how annoying small print can be, even for those of us with the best eyesight, as I have received numerous letters about the small size of the program listings in this column. I can imagine that this would be even more frustrating when one pays good money for a commercial software product from a respectable company such as Optimized Systems Software. But perhaps an even more serious problem lies with the manufacturers that print manuals that are legible, but make no sense to the average computer user. This is seen frequently in the computer industry with companies that let their programmers and engineers write the manuals, instead of hiring a professional writer. Even worse are the companies that do not provide enough documentation, or none at all. Such was the case for a long time with Atari's XL computers. The machines came with a little booklet that gave instructions for setting up the machine and disk drives--a far cry from the reference manual and BASIC book that were included with my original Atari 800 several years ago. Now Atari is including a much more substantial 130-page booklet and hopefully other companies, such as OSS, will move in this direction, for their own good as well as for their customers'.

RAP Intelligence Expansion

October's (1985) column contained instructions for adding your own keywords and responses to RAP. For those readers who still want to teach RAP some new tricks, I have put together over 30 more keywords and more than 100 additional responses. I don't have space to print it in the column, but the "Intelligence Expan-

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FDUMP Program

```
TO PARSE :A
 MAKE "B .EXAMINE :A
 MAKE "C1 INT (:B / 16)
 MAKE "C2 :B - (16 * :C1)
 BREAKUP :C1
 BREAKUP :C2
END
TO BREAKUP :CX
 IF (:CX = 0) [RUN :GR0 GO "Z]
 IF (:CX = 1) [RUN :GR1 GO "Z]
 IF (:CX = 2) [RUN :GR2 GO "Z]
 IF (:CX = 3) [RUN :GR3 GO "Z]
 IF (:CX = 4) [RUN :GR4 GO "Z]
 IF (:CX = 5) [RUN :GR5 GO "Z]
 IF (:CX = 6) [RUN :GR6 GO "Z]
 IF (:CX = 7) [RUN :GR7 GO "Z]
 IF (:CX = 8) [RUN :GR8 GO "Z]
 IF (:CX = 9) [RUN :GR9 GO "Z]
 IF (:CX = 10) [RUN :GR10 GO "Z]
 IF (:CX = 11) [RUN :GR11 GO "Z]
 IF (:CX = 12) [RUN :GR12 GO "Z]
 IF (:CX = 13) [RUN :GR13 GO "Z]
 IF (:CX = 14) [RUN :GR14 GO "Z]
 IF (:CX = 15) [RUN :GR15 GO "Z]
 LABEL "Z
 END
TO DGR0
 MAKE "GR0 [TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 95]
END

TO DGR1
 MAKE "GR1 [TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 223]
END

TO DGR2
 MAKE "GR2 [TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 95]
END

TO DGR3
 MAKE "GR3 [TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 223]
END

TO DGR4
 MAKE "GR4 [TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 95]
END

TO DGR5
 MAKE "GR5 [TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 223]
END

TO DGR6
 MAKE "GR6 [TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 95]
END

TO DGR7
 MAKE "GR7 [TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 223]
END

TO DGR8
 MAKE "GR8 [TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 95]
END

TO DGR9
 MAKE "GR9 [TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 223]
END

TO DGR10
 MAKE "GR10 [TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 95]
END

TO DGR11
 MAKE "GR11 [TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 223]
END

TO DGR12
 MAKE "GR12 [TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 95]
END

TO DGR13
 MAKE "GR13 [TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 223]
END

TO DGR14
 MAKE "GR14 [TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 95]
END

TO DGR15
 MAKE "GR15 [TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 223]
END

TO INITDMP
 DGR0 DGR1 DGR2 DGR3 DGR4 DGR5 DGR6 DGR7 DGR8
 DGR9 DGR10 DGR11 DGR12 DGR13 DGR14 DGR15
END
                TO FDUMP :A
                 MAKE "D :A
                 MAKE "LCNT 16
                LABEL "FD2
                 IF (:LCNT = 0) [GO "FD4]
                 MAKE "CNT 8
                 TYPE :A
                 MAKE "C :A
                LABEL "ID2
                 IF (:CNT = 0) [GO "ID4]
                 PARSE :A
                 MAKE "CNT :CNT - 1
                 MAKE "A :A + 1
                 GO "ID2
                LABEL "ID4
                 PRINT [ ]
                 MAKE "A :C + 256
                 MAKE "LCNT :LCNT - 1
                 GO "FD2
                LABEL "FD4
                 PRINT [ ]
                 MAKE "A :D + 8
                 FDUMP :A
                END
```

Program continued on page 144

Jackintosh
continued from page 57

popular configuration for icons, although not the only one. In my previous efforts of examining memory, I located some of the icons used on the opening display screen. Enter the listing for IDUMP and run it starting at memory location 121370 decimal. The command should resemble the following:

IDUMP 121370

During execution, you will see the file drawer, file folder, trash can, program icon, and data icon. Notice that each icon has a "mask" preceding the icon which is used as a background to prevent the icon from merging with the screen color and "disappearing." Each line on the printout is preceded by it's memory address. The "O" bits are represented by an under (_) for reference purposes. Since this program is only a skeleton, further refinements can be added to make it more useful. For example, instead of using the underline character, you could use a capital "L," which

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TANDY COMPUTERS

Reviews for TRS-80 Model 100 Products

by Michael W. Ecker

The Portable Computer Support Group (PCSG) likes to think of each of its ROM products as the most valuable peripheral that you can add to your Model 100 or 200. Its products include Lucid, a spreadsheet; Write Rom, a word processor; and others. In this review of Write Rom, we'll take a look to see why PCSG feels as it does, and to see whether the company's confidence is justified.

Most of what PCSG produces is combination hardware/software, the hardware in the form of ROM chips which plug directly into the Model 100 (and presumably the 200 as well). Installation is easy, and once your chip is installed, you're ready to work. In effect, each package augments the existing built-in programs by providing another one. Each such package comes with accompanying manual on use of the program. Since the program is in read-only memory (ROM), none of the precious random-access memory (RAM) is used up. Even if you've expanded memory, you'll appreciate this memory-preserver.

The Problem With TEXT (or, why the need for Write Rom?)

I own six computers, one of which is the TRS-80 Model 100 portable. I bought it just this past July as a $299 closeout from the local Radio Shack store, equipped with the standard 8K. Since then, I have added another 24K to bring it up to 32K, purchased several cables, particularly for the printer and the built-in modem, and obtained a few books, some review software, and maybe one or two goodies. I frequently carry it with me, particularly to my university, occasionally showing a class a BASIC program I've written which demonstrates or implements some algorithm or mathematic process. Clearly, then, this has been an enjoyable and good purchase for me. Typing is very pleasant, and its use grows on me.

Yet, for some reason, I found that I was not really using the Model 100 as much as I had thought I would be. Was my wife right in condemning me for having made an impulsive purchase of just another toy?

I thought about the matter logically. I realized what the problem was. I had purchased the computer to be able to write letters, short articles, memos, reviews and so on, in addition to writing BASIC programs and occasionally telecommunicating with a local BBS or two. Yet, after initial use, I was not doing much word processing on the Model 100. Why not?

The 100's built-in TEXT program is the culprit. It simply is too primitive. I quickly became disgusted with the way it would keep printing out without any top or bottom margins, thus printing nonstop right over the creases separating the pages of continuous printer paper. Moreover, the only way to get my printers - non-Radio Shack printers, I should emphasize - not to keep printing over the same line, was to change the DIP-switch setting. I could do this on my C. Itoh 8510 Prowriter, but I was not sure how to do it on my Legend 880 printer, particularly since I don't even know where the Legend's DIPswitches are! Besides, I have little desire to keep changing the Prowriter's switches.

So, now I knew what the problem was: my dread of the printouts using just the basic Model 100 as originally purchased. I investigated the Radio Shack catalog. It advertised a program called Scripsit 100. I checked it out. It seemed an improvement, but a bit involved, and besides, I was feeling stingy that day, so no purchase. As an interesting irony, I was later to learn that PCSG is the outfit behind that Scripsit 100 package as well, having produced it some two years ago. That package, you see, is a cassette-based one. Thus, you would either have to load a tape or else use up RAM to keep it in memory. (Since then, I have also looked at other tape-based systems, such as Auto Pen from Chattanooga Systems Associates.) I tell you this to make clear that I was already hungering for something better.

Enter-Write Rom

Then I learned of Write Rom and PCSG. I contacted the company and arranged for the acquisition. I might add that I had to pay for my review copy, although I got a courtesy discount for the purchase. My analysis of my malaise with the 100 led me to believe that this would be a good purchase for me personally anyway. Besides, the company is producing hardware (much more expensive than just software) and hardly can be expected to give away freebies to every reviewer in town, right? Bear in mind that if a reviewer bestows praise on a product he buys, it is more significant than if he were to obtain it free of charge. And, I will tell you right now that I do not regret the purchase at all. The only thing I regret is letting the package sit in a pile for almost two months before trying it and using it!

Write Rom is a text formatter entirely compatible with the existing Text program. Write Rom adds to the Text program by allowing you to control numerous features, including margins, justification, centering, bolding, indenting or undenting, search-and-replace, headers and footers, multiple-line spacing, printer control and setting, as well as other printer and other features. At review time, I did not see any capability to handle superscripts or subscripts, nor any mention of these in the index, so these may not be included. It was also not clear to me whether the program corrected the Text program's horrible practice of breaking a line at a left parenthesis, with the parenthetical material on the next line. Short of these questions, however, I found my other concerns answered and met. Since it would take too much space to list every feature, I'll mention just a few in more detail.

Consider, as I mentioned before, that the Model 100 Text program would not issue a line feed with each carriage return to a non-Radio Shack printer. This had previously forced me to stick to my Prowriter, as I know how to work the DIP-switch settings on it. However, I really wanted to be able to make some use of the less-used Legend printer; the Prowriter was already hooked up to both my TRS-80 Model 4P and my Sanyo 555 (using a switch box), whereas the Legend was only hooked up to my new Tandy 1000.

Moreover, even if I did use the Prowriter, it is annoying to have to keep changing the DIP settings. No problem with the Write program (the file name is Write and appears in the menu right along with Text, BASIC, and the rest). So, that problem is solved beautifully. What about the nonstop printing right over the bottom edge of the paper? Again, handled by Write Rom's global formatter.

Write Rom in Action

In practice, when you turn

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Quick Look at Tandy Portable Products

by Michael W. Ecker

Had I not just finished reviewing Write Rom, I might have been more excited about Chattanooga Systems Associates word processor, AutoPen. I received my review copy from the company (CSA) as part of a larger offering, AutoPack, which also contained a mail merge option for names and addresses with salutations, a simple (and disappointing) calculator program, a database program, the spreadsheet program AutoPad, and a few more. Most of these have "Auto" as part of their names (the significance of which is unclear, unless it means "automatic," an exaggeration in this case). You can either purchase individual programs, such as AutoPen, AutoPack, AutoSort, or else the entire collection, AutoPack, at a much lower price than if you were to purchase the individual programs. Unless I'm mistaken, however, the programs are somewhat integrated to allow some use together. I did not try this in this preview of AutoPack, so I will not comment on the degree of integration.

All programs are in BASIC and come on cassette, to be loaded with the CLOAD command. As such, we run into a fundamental problem. Either precious RAM is going to be used up, or else something is going to have to be shortchanged. Indeed, CSA itself advises of the need to be careful of certain kinds of errors, as the company has opted to keep RAM consumption for each program down, typically between .5K and 3K for its offerings. Another consequence is that programs run slower than the comparable programs on desktop computers, and are limited to small applications. I cannot see using a tape-based or RAM-based system on the Model 100 for a database, either, in this stage of computer development. If I were a beginner, I might not mind quite as much. In general, if you have a desktop machine, or other Model 100 products such as Write Rom, you're probably not going to be satisfied. On the other hand, if your budget is tight, CSA's price cuts may make some offerings attractive here - provided the program runs to your satisfaction.

Since my system had been affected by Write Rom, I could not be sure as to whether improvements in performance of Text were due to AutoPen, the word processing supplement to TEXT. Hence, I will not give a review at this time beyond mentioning some features of it. These include many of the kinds of features I mentioned in the Write Rom review, above (justification, centering, setting of margins, etc.) Commands are entered via the initial periods, although they are not Wordstar's dot commands, and they must be entered in lower case. One feature that might be a mild attraction is the ability to turn your keyboard into a typewriter for such things as typing addresses on envelopes with your printer.

Several of the offerings, including the spreadsheet, AutoPad, reveal that a lot of work has gone into their production. Unfortunately, three things

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Tandy Reviews

by Lon Andrews

Probaloto

Probaloto by Gary Olander is available for TRS 80 III/4/ Color (Tape or Disk), AT&T, IBM and others with CP/M. So far so good but just what the heck is Probaloto. At first I thought of an exotic cheese but then I found that it is actually a lottery number prediction program. Designed to allow the computer owner to take advantage of the growing number of state lotteries, Probaloto is supposed to give you an edge in selecting lottery numbers.

The documentation is complete and will probably not be used too often by most as the program is very easy to use. The version I have runs on TRSDOS 1.3 (not one of my favorite DOSs but you can't have everything all the time) and is easily copied from the data disk to a systems disk using the COPY command.

The program is menu driven and leaves little to chance. By answering the prompts you will be presented with a list of numbers likely to be picked in the lottery of your choice. Since the state's lotteries are different in format you will have to tailor the program to your needs by providing the information requested by the program. A list of past numbers selected is an asset. I am told that these lists are sold in states that have lotteries (We don't).

You are given a choice of 3 or 4 number picks or the regular lottery which has two lists of numbers governed by parameters selected by you. A data file can be set up that contains previously selected numbers and the number of times they have picked (from the list mentioned above). There is an option that allows weighting of the number selection. You are allowed to weight the selection toward the most often selected or the least often selected. This again is menu and prompt driven--easy to use. If the weighted selection is not used then the numbers are random. If you use the weighted selection the laws of probability point you toward the least picked numbers.

Without taking up a lot of room let me say that I set up a lottery and ran a few trials in the family room. My wife thought I was going nuts (more so than usual). After having run the lottery enough to generate a track record I used Probaloto to pick my choices. I had pretty close to 9% more successful pairings with the program than by random selection. I even tried using my age but Judy told me that they didn't use three digit numbers in the lotteries.

If you play several lotteries be careful to change the program parameters when you change lotteries. Perhaps you would be better off to use a different disk for each lottery. Eliminate a frustrating error before it happens. You know what Murphy said!

All in all the program is well written and documented. It is easy to understand and run. I had no problems with Probaloto. As to whether or not you should use it...that's up to you. If you do buy lottery numbers...GOOD LUCK. If you win Two Million Dollars...my address is... Probaloto, $19.95, Gary Olander, 322 Haymarket PL, Gahanna, OH 43230, (614) 475-3315.

Superdisk

Intellitech Corporation has released a RAM disk program for NEWDOS/80 to simulate a disk drive in RAM. This gives NEWDOS/80 a feature similar to TRSDOS's MEMDISK. I was never too much impressed with a RAM disk until the SUPERMEM board came along. A RAM disk with 400K or 500K gives you something with enough storage to make it worth the time and trouble to set it up and use it.

Superdisk is not hard to set up, if you are already a NEWDOS/80 user with some experience. Otherwise follow the directions carefully and you will not have any trouble. Be careful if you have other than the usual two drives. There are other steps to be taken if you use a "non-standard configuration of drives" or a hard drive. Again, its just a matter of following the directions.

If you have used a RAM disk you are already aware of the assets, and liabilities, of using such a program. If not, you should know that it takes the wait out of word processing, data base management and other programs that make you wait while they sort, search, write and so on. In the RAM disk it is all done in the computer's RAM memory which means little or no waiting. There is one big liability. Since everything is held in RAM, if the power goes off or you turn the computer off--bye, bye data! This can be offset by frequent copying from RAM disk to floppy or hard drive. Don't forget to save your data files to the floppy disk from the RAM disk when you are through. This is probably the most common error made in using the RAM disk. It is so much like a real "honest to John" disk that you can easily forget to move the data file to permanent storage when the session is through.

To set up Superdisk you need a non write-protected copy of NEWDOS/80 2.0 or 2.5. Place the DOS disk in drive 0 and boot the computer. Use the following to set up the disk: PDRIVE 0 9 TI = A TC = 40 SPT = 10 TSR = 3 GPL = 2 DDSL = 2 A (ENTER). Place the Superdisk in Drive 1 and type: COPY 1 0,,CBF NFMT SPDN = 9 NDMW (ENTER). If you have only one drive the set up is just as easy but takes longer as you have to go through the disk swapping in drive 0. Once the three files are copied to your DOS disk you need to make the DOS aware of the fact that you will have another disk drive. Type SYSTEM 0 AL = n (ENTER). "n" is the number of physical disk drives in your computer *plus 1*. Reboot your computer and type SUPERDISK (ENTER). That's all! At this point you have an extra "disk" drive as far as the computer is concerned. Note: If you have four physical drives in your system you will lose one to the Superdisk set-up.

Superdisk installs to the defaults set up by the program. You can change these to suit your individual needs by using the complete command line as follows: SUPERDISK DRIVE = a DZERO = b SYSTEM = c TOPMEM = d BANKS = e MMSECT = f APDRIVE = g ASPEED = h CANCEL (ENTER). In the command line you can set the drive number for SUPERDISK (a), the drive number assigned to drive 0 (b), which drive is to be the system disk (c), the highest memory that Superdisk is allowed to use (d), how many banks of memory that are to be used (e), how many sectors are to be stored in the main memory bank, automatic PDRIVE setting (g), Set the Model III to run at Model 4 speed (h) and CANCEL to deactivate Superdisk.

Alpha Technologies Supermem board is supported by

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Model 100
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on your computer, Write Rom is available as the file "Write" on your menu. If you touch the Enter key when the cursor is on Write, then you access the Write Rom menu. If you have any text files - (which appear as .DO, or document files), then they and they alone appear. There are various options now available. By and large, these in turn invoke submenus. You can change global settings if you do not like the default settings. For instance, I did not like the right margin at 64, so I changed it once or twice, ultimately settling on 77. Following the menu or the instructions, I easily found that touching the F7 function key will change settings. There is no need to memorize this, as this is clear from the menu itself. From the new menu thus accessed, I chose the F6 page option so as to consider the page parameters. Then touching F2, I changed the right margin setting. In fact, it was simpler to do it than to say all this.

In addition to global settings, Write Rom allows you to use its Wordstar-like editor. If you know Wordstar, you'll feel at home. Personally, I've avoided Wordstar up until now, but in deference to Write Rom, I now have the motivation to learn Wordstar (I'll use the copy which came bundled with my Sanyo). There are some additions peculiar to Write Rom and not found in Wordstar, but let me skip those. You'll find the dot commands for local formatting; that is how you control the centering for instance, as well as justification. You can vary margins locally throughout your text and do lots of things associated with a decent word processor.

Here are three other nice features. You can create duplicate style documents without losing the original. Say you wish to keep a form letter or part of one in RAM. You don't have to retype, of course, but nor do you have to go to as much trouble with paste and copy in order to make a modified version without losing original version. You can also insert %D in the document, and when it comes time to print, the date will appear in its place, based on whatever is presently in memory. Fantastic! In the same spirit, you can kill text files without having to go into BASIC, another nice feature.

None of this would do any good were it not for a very good manual. All of the basics are covered, and even brand new computerists can overcome any fear and use the manual with success. There is an index, a quick reference guide, tabbed sections for quick location of topics, and plenty of examples to see what is being discussed as it will appear on the screen and/or the printer.

Summary

At the original $149.95, Write Rom's price would have surely caused some people to hestitate buying it. But don't let that stop you, particularly since a) it is a superb product which does what PCSG claims it does, and b) the price has just been lowered to $99.95 (plus $5 shipping). The evident reason for the price change is not failure to sell, incidentally, but rather to have better pricing vis a vis PCSG's new Super Rom, which includes Write Rom, Lucid, and two other products on a single chip, all for $199.95. Thus, those who want only Write Rom will feel more comfortable about getting just it; if the price differential were just $50, PCSG would be competing with itself and lose its market for Write Rom as a standalone product.

The pleasure is back in using my Model 100. I had been thinking about using the serial port to transfer text files to another computer. (Indeed, PCSG itself supports at least one such product, but that may be another review!!) But now I don't have to think about such matters, since I now can handle the text editing right on the Model 100. True, I still prefer, while at homne, to use LeScript on my TRS-80 Model 4P (to get the microjustification and proportional spacing), but I love the idea that I can bring my portable anywhere, type anything, come home and run off the formatted output, something that I would rather not do with the not-so-portable TRS Model 4P portable. If you have use for word processing on your Model 100, you'll love this product!! Heartily recommended!

Write Rom text formatter for TRS-80 Model 100 portable, $99.95 + $5 shipping. Portable Computer Support Group, 11035 Harry Hines Blvd., #207, Dallas, TX 75229, Phone: 1-214-351-0564. ●

APPLE

AppleWorks Calling

by Mr. Tulloch

If you've been on Earth during the last year or so, you know that AppleWorks is one of the hottest selling software packages around. There's a good reason. AppleWorks for the Apple II family is an "integrated" software package — word processor, spread sheet, and data base. It's easy to use and does a pretty good job on each function. But did you know that AppleWorks can make your telephone calls?

Yes, that's right, AppleWorks can control your telephone! It requires the help of a modem but your Apple supplies most of the "smarts." This article will tell you how to use AppleWorks to make your telephone chores easier. All that's needed is a clever new product called the T-310 (available from I.H. Systems, P.O. Box 858, Roswell, GA 30077). If you already have an auto-dial modem (Apple, Hayes, etc.) the same techniques can be used. By combining the power of your modem and your AppleWorks program, you increase the usefulness of both.

I became interested in adapting AppleWorks to make my calls after I saw some IBM PC software making calls. If you can do it on a PC, you ought to be able to do it (and do it better) on an Apple II. My first problem was the cost of purchasing a modem. (I guess everybody has one but me.) I haven't gotten the telecomputing bug yet. With a baby on the way, my wife has tried hard to innoculate me against all new bugs. However, where there is a will, etc. I found a new device which performs all the telephone controlling functions of a smart modem (and several more besides) but costs a lot less.

The T-310 costs just $299 and includes the device, telephone cord, and transformer. It uses a standard RJ-11c (the new little plug type) telephone connector. There is also a connector to plug in a telephone so you won't need an adaptor. An RS-232 connector is used to send data to and receive data from the computer. The T-310 operates at 300 baud, sends and receives Touch-Tone (R) signals, and even has a connector for audio input. It uses a wall mounted miniature transformer to supply power. There are two red LEDs on the front panel: OH which indicate "off-hook" (the T-310 has picked up the phone) and CD which shows data being transmitted. A nearly Apple-beige plastic box 4.5 inches wide by 1.5 inches high by 9 inches deep contains two printed circuit boards. The T-310 is an adaptation of the T-300 modem which shares most of these features.

The other piece of hardware required is a serial board, but you can use the same one which drives your printer. The cable connecting the serial port and the T-310 must reverse pins 2 and 3, because the T-310 is wired up like a modem, not a printer. A better, and of course more expensive, approach is to use a separate serial board.

I have a parallel card for my daisy wheel printer in Slot 2 and a Super Serial Card for my Imagewriter in Slot 1. Slot 3 is "occupied" by an extended 80 column card. So I stuck another Super Serial Card in Slot 4. Super Serial Cards (from Apple) are nice because they're easy to set up for any strange device. Figure 1 shows the switch settings I used for the T-310. Note that the Modem eliminator block is set up for a modem. Since I used the modem eliminator block in the Super Serial Card I could use a standard RS-232 cable.

One last connection is required. The wall mounted transformer is plugged in and attached to the power input jack on the back of the T-310.

Once the hardware is installed and connected you must build a data base. Figure 2 is a screen dump of one page from my data base. You'll notice some strange entries. These are the command sequences to address the T-310.

Data Entry Format

Setting up a data base format is explained starting on page 48 of the AppleWorks manual. You can use any arrangement that you wish. However, each one of your records must contain at least the following fields:

Name — so you know whom you're calling

* CALL — which contains the code to dial a number on the T-310

* LD — any long distance access codes

NUMBER — the seven digit telephone number

AC — the three digit area code

* HANG — the code which causes the T-310 to hang up

Note that if the number is only a local call, the AC and LD entries should contain the "-" character that AppleWorks uses to denote an empty entry.

For the T-310, the entries marked * above must contain certain characters. In the CALL field you must enter ">TD". This code tells the T-310 to dial the digits which

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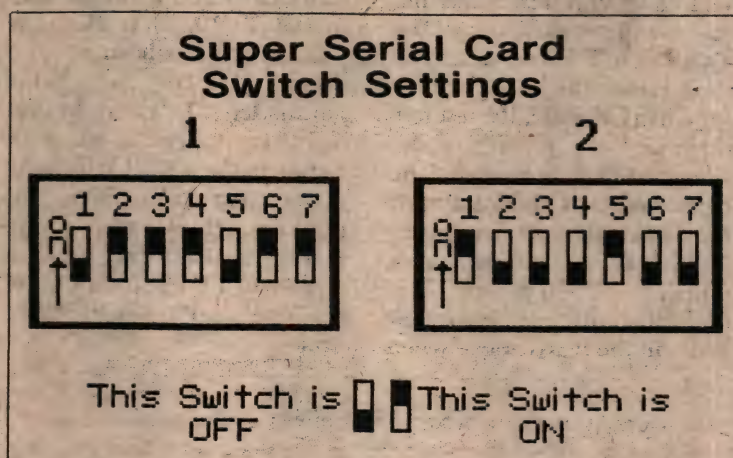


Figure 1

```
File: PHONE2    REVIEW/ADD/CHANGE Escape: Restore former entry
Selection: All records

Record 65 or 87

CALL: >TD
LD: 2131320,,,/67242
AC: 826
NUMBER: 5824255
NAME: Sawyers, Marvin
HANG: >DC

Type entry or use § commands                        153K Avail.
```

Figure 2

Third Generation Spreadsheet Program For The Apple II

Synapse, a division of Broderbund Software, recently announced the release of SynCalc, a powerful new spreadsheet program for the Apple.

SynCalc, until now only available for the Atari and Commodore computers, offers Apple owners a manageable yet comprehensive spreadsheet program that is designed for both personal finance projects, like home budgeting and checkbook balancing, and small business applications, such as sales forecasts and income tax projections.

The new and improved SynCalc contains all the features users expect from an electronic spreadsheet--flexible formatting, variable column widths, special format options such as centering and comma insertion, and vertical and horizontal split-screen capabilities. But Apple SynCalc takes the product standard one step further.

Apple SynCalc features SynCalc's break-through easy-to read "pop-up" menus with an even easier-to use menu structure. Users will now find program options always listed on the screen, so they won't have to memorize a long list of commands. And now they can choose either a 40-column or an 80-column format.

SynCalc offers a new flexibility, allowing users to move through a spreadsheet page by page or to the beginning or end of a document instantly. With 128K of memory, SynCalc now has 79K of free memory above and beyond what the program needs. And the highly successful "novice" and "expert" options fit the needs of a wide range of users, no matter what their experience with financial management programs.

SynCalc requires a 128K Apple IIe with extended 80 column card or Apple IIc, on disk drive, and a monochrome monitor. An Apple IIe- or IIc-compatible printer is optional.

SynCalc has a suggested retail price of $49.95.

Broderbund Software, Inc., the San Rafael, California based personal software publisher, was founded in 1980 to bring a broad range of carefully developed, top quality software products to the microcomputer market. Programs range from educational and personal interest to home and small business tools. Broderbund has had more products reach the number one position on the leading best seller charts than any other software company.

For additional information contact Broderbund Software at (415) 479-1170.

Mention that you read about it in the *Computer Shopper*. ●

Mac-Like Desktop For Apple II

Mouse Desk, a new "desktop organizer" and program selector, brings the simplicity of the Macintosh environment to the Apple IIe and IIc and enhances the speed and convenience of using mass storage systems.

As a desktop organzier, Mouse Desks simplifies "housekeeping" activities, such as copying, moving and deleting files, which otherwise require complicated and cryptic command sequences. With Mouse Desk, the user executes all tasks with a point-and-click technique, using a mouse to move icons that represent disks and files.

Mouse Desk also functions as a program selector. Instead of swapping floppy disks--a time-consuming process-the user can switch rapidly between programs loaded on a mass storage device. Mouse Desk works with all popular hard disks for the Apple II line, as well as with Apple Computer, Inc.'s new storage systems, UniDisk 3.5 and the Apple II Memory Expansion Card.

Mouse Desk is the fourth in a series of Macintosh-like productivity programs for the Apple II which were developed by Version Soft, a leading French software publisher. International Solutions, Inc., of Sunnyvale, Calif., localized the programs for English-speaking markets, and is distributing them outisde Europe. Other products in the series include Mouse Word, a word processor with integrated communications; Mouse Calc, a spreadsheet with integrated graphics; and Mouse Budget, a personal financial management program.

Dual Functions Add Power And Convenience

Like the Macintosh operating environment, Mouse Desk uses a desktop metaphor, with icons to denote disks and

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AppleWorks Calling continued from page 61

```
File: PHONE2          REPORT FORMAT          Escape: Report Menu
Report: PHONE.CALL
Selection: NAME contains Z

HANG
CALL LD                        AC NUMBER

----------Each record will print 6 lines----------

Use options shown on Help Screen                    E-? for Help
```

Figure 3

```
File: PHONE2                  PRINTER OPTIONS          Escape: Report Format
Report: PHONE.CALL

-------Left and right margins--------      ------Top and bottom margins-------
PW: Platen Width          8.0 inches      PL: Paper Length          1.0 inches
LM: Left Margin           0.0 inches      TM: Top Margin            0.0 inches
RM: Right Margin          0.0 inches      BM: Bottom Margin         0.0 inches
CI: Chars per Inch        12              LI: Lines per Inch        6

    Line width            8.0 inches          Printing length       1.0 inches
    Char per line (est)   96                  Lines per page        6

                    ----------Formatting options----------
                SC: Send Special Codes to printer                   No
                PD: Print a Dash when an entry is blank             No
                PH: Print report Header at top of each page         No
                OL: Omit Line when all entries on line are blank    No

Type a two letter option code                                  153K Avail.
```

Figure 4

```
Disk: Drive 2                 PRINTER INFORMATION       Escape: Other Activities

  Main Menu
    Other Activities
      Printer Information

      Change standard values
      1.  Open-Apple-H printer  Imagewriter (Slot 1)

      Add or remove a printer
      2.  Add a printer (maximum of 3)
      3.  Remove a printer

      Change printer specifications
      4.  Phone (Slot 4)
      5.  TP-1 (Slot 2)
      6.  Imagewriter (Slot 1)

Type number, or use arrows, then press Return                  153K Avail.
```

Figure 5

```
Disk: Drive 2                 CHANGE A PRINTER          Escape: Printer Information

  Main Menu
    Other Activities
      Printer Information
        Change A Printer

      Printer name: Phone (Slot 4)

      Printer type: Qume Sprint 11

      1.  Needs line feed after each Return      No
      2.  Accepts top-of-page commands           No
      3.  Stop at end of each page               Yes
      4.  Platen width                           13.2 inches
      5.  Interface cards

Type number, or use arrows, then press Return                  153K Avail.
```

Figure 6

follow. The LD field must contain the digits of your long distance service. If you are using the so called "dial 1" to access your long distance carrier, then you should simply type in a single digit :1. If you are still accessing your long distance service with a separate local number or can use AUTOVON, WATTS, etc, the LD field should contain those digits. In my example I am using MCI. The first seven digits are the local telephone number of my MCI long distance service. The commas following the numbers each cause the T-310 to wait 1.5 seconds. The slash causes the T-310 to look for a tone. Finally, the last five digits are my security code. The HANG field contains the command >DC which stands for disconnect or hang up. Table 1 shows other commands which the T-310 accepts. You can substitute the equivalent codes in the fields above when using another manufacturer's device.

The simple way to enter all the various commands is to use AppleWork's default mode. All default values are automatically entered for each new record you insert. Page 62 in your manual explains how to enter default values.

Report Format

Once you have set the default values for the appropriate codes, you must create a report format. Figure 3 shows the report format I used to send dialing information to the T-310. Note that the page length has been set to 6 lines (Figure 4 Print Parameters). I did this so that if I wish to call a series of numbers the T-310 will hang up between calls. Since AppleWorks thinks that you're sending the file information to a printer, it is important to set the printer descriptions properly.

T-310 Commands
Table 1

```
Parametric Commands:
>MF  Controls Message format
>EC Controls character echo to computer
>PY sets parity to computer
>MR Sets max number of rings before giving up
>AN Controls answer
>ER Sets number of incoming rings befor answer
>DT Sets no-activity disconnect time-out
>SC Sets security checking
>SE Sets security code

Line Control Commands
>TD Originates call
>SZ Seizes line
>DC Disconnects line
>FL Performs switchhook flash
>DM Tests for dial tone
>CF Enables call following

System Commands
>ZZ System reset
>DS Display system status

Control Characters
CTRL-C Forces answer; aborts call following
CTRL-H Backspace
CTRL-J Line feed
CTRL-M Carrage return
CTRL-Q XON
CTRL-S XOFF
```

Printer Setup

The best way to define a psuedo-printer to drive your T-310 is to use a custom printer designation. Unfortunately, I had already used the custom printer feature to configure AppleWorks for my TP-1 printer. It would be a real pain to re-configure the custom printer whenever you wanted to use the printer or the phone. Luckily, the T-310 is relatively insensitive to garbage transmitted to it. My solution was to use one of the standard printers available in the Appleworks printer setup function. Figures 5 and 6 show the results. If you are using an auto-dial modem you may not be so lucky. AppleWorks sends several commands to the Qume Sprint 11. These commands may not be ignored by your interface. Try choosing another of the standard printers. One of them may work. Allowing only one custom printer is one of the few limitations of AppleWorks which really bothers me.

Conclusion

You can add fields to your database which allow you to make special calling sequences. Say you are a produce salesman. You can create a database which contains the name, address, and telephone number of all your customers. By including a field which lists the type of produce purchased by that customer, you can use the select command to call all your customers who buy cabbage, or horseradish. Thus you can greatly simplify your work when a new shipment of vegies arrives.

Similarly you can identify customers or clients by any additional information you wish to enter. All this information can be placed in one giant database. This data base can then be used not only to make calls, but to print mailing labels, keep track of preferences, or even personal information. There is nothing like remembering a client's wife's name when you call. AppleWorks can do it all. ●

MACINTOSH

MacUniverse

by L.J. Kutten

Rumors about a new Mac are still flying fast and furious. However some consistency is now appearing . First talk of a color Mac has ceased. At the same time, everybody agrees that the new Mac will be available in variety of configurations. Minimum memory will be 512K expanable to 1, 2, and 4 megs. A built-in hard drive will be offered and a trackball may replace the mouse. Look for a formal announcement at Apple's annual stockholder's meeting next January.

GRIPE OF THE MONTH: At times Apple does things that are so dumb I wonder how it manages to stay in business.. Last week, my Mac died (the screen went blank) so I took it to an authorized Apple dealer for repair. Based on the symptoms, the service technician thought it was a bad power supply board and he could fix it within a day. The next day he called and had good and bad news. The good news was that it was a bad power supply board and that he could repair it. The bad news was that Apple would not let him fix it. Allegedly the insulation on the wires connecting the power supply board to the CRT had melted and fused the board directly to the CRT. Since he had never seen that sort of damage, he called Apple. They instructed him to send my Mac to their Chicago service center so their technicians could examine the unit and determine the cause of the meltdown. The minimum repair time including transportation would be two weeks. I then asked about a loaner since the reason for the delay was Apple's interest in the unit, not his inability to fix it. The answer was no. I then tried Apple's St. Louis office. My first call did not even get past the operator. I was told point blank that I had to work through my dealer. On my second call I identified myself as *Computer Shopper's* MacIntosh columnist. This got me a person who listened to my tale of woe. After some discussion Apple agreed to loan me a Mac. Undoubtedly Apple realized it was in their best interest that I be able to write this column.

This got me thinking about my previous computers and local repairs. When I was using Radio Shack computers, Tandy service used to have a policy of a 24 hour turn around. (I even had a repair completed before I got home after dropping the unit off). When my IBM equipment went on the fritz, the IBM service technician was at my office within 8 working hours. So what does Apple do? It decides the local dealer, who has the ability to fix my Mac, should not fix it. How can I recommend that any business person not buy a Mac. for me, being without my Mac for a day is merely an inconvenience. But being without it for two weeks means I might as well close up shop.

SIDEKICK: Borland International, well known in IMB circles, has finally released its first Macintosh software. Called Sidekick, it is a collection of useful application and desktop accessories. Among the programs included are (1) a miniword processor; (2) a telecommunication program; (3) a full featured business and financial calculator; (4) a print spooler; (5) a calendar; (6) a thing to do file; (7) an alarm system; (8) a phone log; (9) an expense account file; (10) a report generator; (11) an analog clock; and (12) an area code lookup.

Many of the programs on Sidekick are individually available either free of charge or as shareware on Compuserve. What differentiates the Sidekick versions from them is that Borland has integrated its versions so that information from one can be used by another.

Installing Sidekick on a floppy is very easy. It comes with a program called Desk Accessory Installer which allows the user to select which accessories and programs to install. Installation on a hard disk may not be as easy. Borland's installer did not work on a MacBottom. I ultimately installed them by using Apple's FONT/DA mover. I opened the system file on the Borland disk and copied the desk accessories over to the hard disk system.

Sidekick is not cheap with a suggested list price of $84.95 and I cannot recommend it at that price. If you can find a mail order dealer who will sell it for $50 to $60, give it serious thought.

DEJA VU: This is the first truly graphic oriented adventure game your Universe Master has seen. Desigend specifically for the Macintosh interface, objects and movement are controlled by a mouse. For example to examine a desk, click on the desk, then click "examine" in the command box. To move click on the exit and then "go" in the command box. The beauty of this system is that it elimiantes the requirement to type in command which in turn eliminates typographical errors.

The goal of the game is to solve a 1940 murder mystery. The player is the victim of a nefarious plot. Some dirty rat is trying to pin a murder rap on you. You must solve the murder or at least explain it away so the coppers don't throw you into the pokey. The adventure is peopled with muggers, gangster, blonds with guns, and other assorted lowlifes who want to do you

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Macintosh Users Now Puzzled!

WordPlay, the first educational product in crossword puzzle style for the Macintosh is now available from Palantir Software, Houston, Texas. WordPlay challenges the vocabulary skills of children and adults alike, from age 10 and up. Teachers especially will enjoy the ability to create their own puzzles and print them out with their own customized clues. WordPlay increases vocabulary while enhancing logic and reasoning skills. Crossword puzzles on disk--a first in the Macintosh software world.

Puzzles come in sizes from 4 by 4 on up to 23 by 23. Diagramless puzzles are also included. You can guess at words without having to erase mistakes, or type in a word then move it to another location with ease. Printing can take place at any time whether finished or in progress, complete with clues. Never before have crossword puzzles been so easy or enjoyable to solve. WordPlay will be followed in the near future by additional volumes of new puzzles. A variety of puzzle types will also be emerging, for those who enjoy playing with the English language any way they can.

For more information contact Palantir Software, 12777 Jones Road, Suite 100, Houston, TX 77070, (713) 955-8880.

Mention that you read about it in the *Computer Shopper*. ●

MacLink Bridges IBM's Displaywrite/DCA & Macintosh

Dataviz, Inc. of Norwalk, CT, has announced major enhancements to MacLink, its communications program that links the IBM PC and the Apple Macintosh. MacLink will shortly support file transfers and translations between Displaywrite/DCA on the IBM PC and several word-processing programs on the Mac, including both MacWrite and Microsoft's Word.

As with other MacLink translators, the new, two-way translators will convert both the text and the "intelligence" of a source file to its new format. Paragraphs, margins, and even print styles--such as bold face, underlined, or superscripts--will all be properly converted and available in the target document.

The result is that a MacLink user can easily move a file from one word processor and machine to the other, without losing any of the effort already invested in the document.

Initially, the new version of MacLink will support translations between the DCA format on the PC and MacWrite on the Macintosh. Later in the year, direct translations between Displaywrite/DCA and Word will also be available.

Because Microsoft's Word and many other programs for the Macintosh can read MacWrite files even the initial version will allow users of those products to have access to Displaywrite/DCA files on the PC.

The upcoming versions of MacLink will also convert simple, PC text files into usable word-processing files on the Macintosh--removing unneeded carriage returns from the PC file and establishing appropriate paragraphs. This will allow the text output of nearly any word-processor on the PC to be usable within MacWrite or Word on the Mac.

Other new enhancements to MacLink will include the ability to transfer Lotus 1-2-3 files to Jazz or Excel on the Macintosh, and to transfer Word files between the PC and the Mac.

MacLink was originally released by Dataviz in February, 1985. It supports the transfer of any file between the IBM PC and the Apple Macintosh, and works with either a direct cable connection between the two machines, or modems.

Other file translators provided with MacLink include document conversions between Wordstar and MacWrite and Multimate and MacWrite, and spreadsheet conversions between Lotus 1-2-3 and Multiplan. The latter translate data, cell references, formulas, and even column formats for use in the target spreadsheet.

MacLink includes a PC diskette, a Mac diskette, and a users manual. It retails for $125. For an additional $30, an eight-foot interface cable is provided which supports direct communications between the two machines.

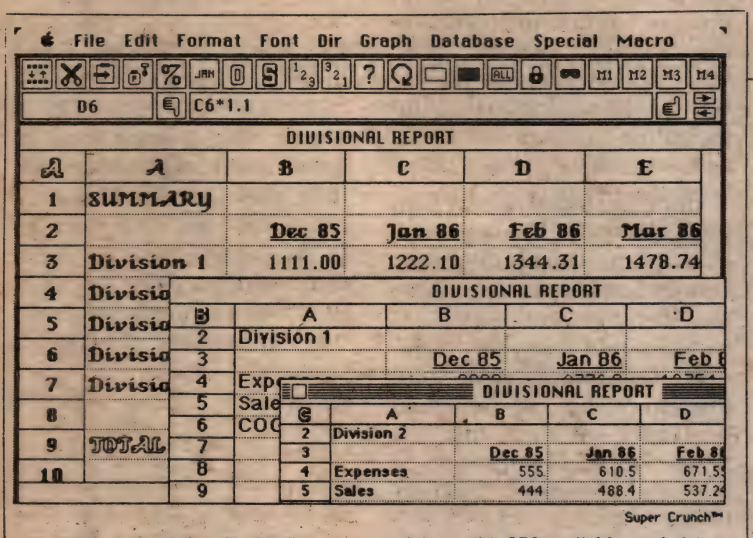
For additional information contact Dataviz, Inc., 16 Winfield Street, Norwalk, CT 06855, (203) 866-4944.

Mention that you read about it in the *Computer Shopper*. ●

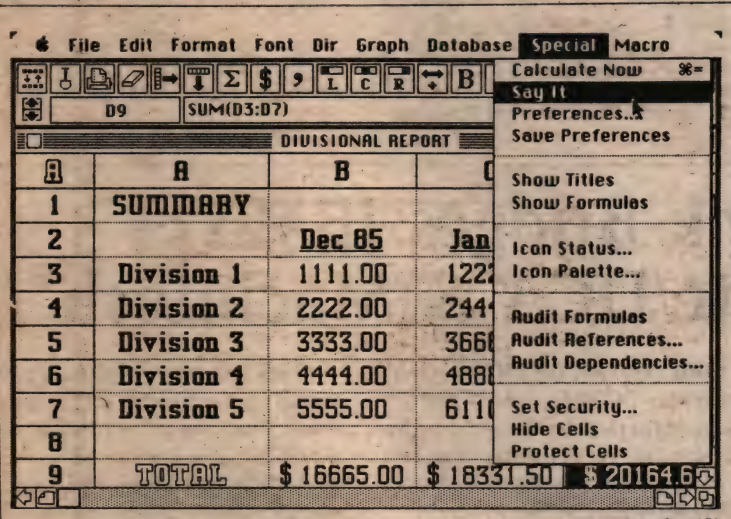
Paladin Unveils Super Crunch

Paladin Software Corporation will publicly unveil Super Crunch, a more powerful version of Crunch, Paladin's first spreadsheet for the 512K Macintosh. Super Crunch picks up where Crunch leaves off by adding macros, increased speed and performance, and a host of additional power features. The suggested retail price for Super Crunch will be $295, and Paladin expects to initiate shipments in the next two months.

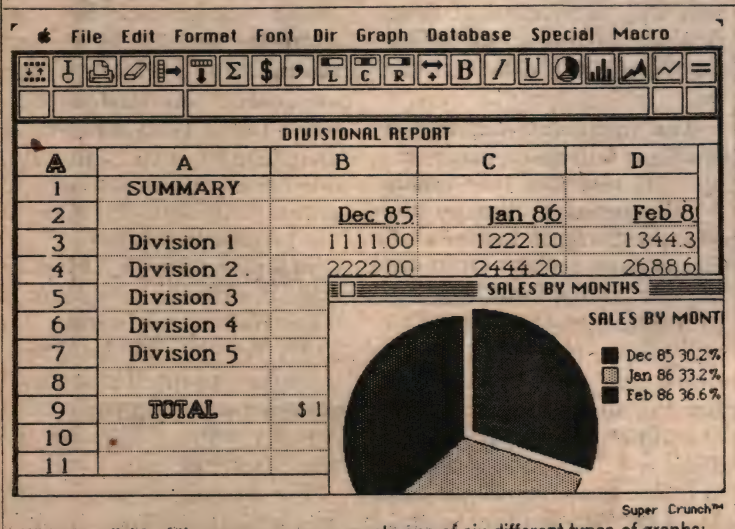
"Since June when we started shipping Crunch, we have received a wealth of positive feedback and useful suggestions for Crunch product upgrades. We are implementing these suggestions, and more, in Super Crunch," said Ted Newlin, president and C.E.O. of Paladin. "While Crunch offers all the spreadsheet power that many people will ever need, Super Crunch is Paladin's answer to the demands of the truly sophisticated spreadsheet user. Yet, because of our unique use of icons, Super Crunch is still just as easy to learn and use as is Crunch. And ease-of-use spells increased productivity for the user."



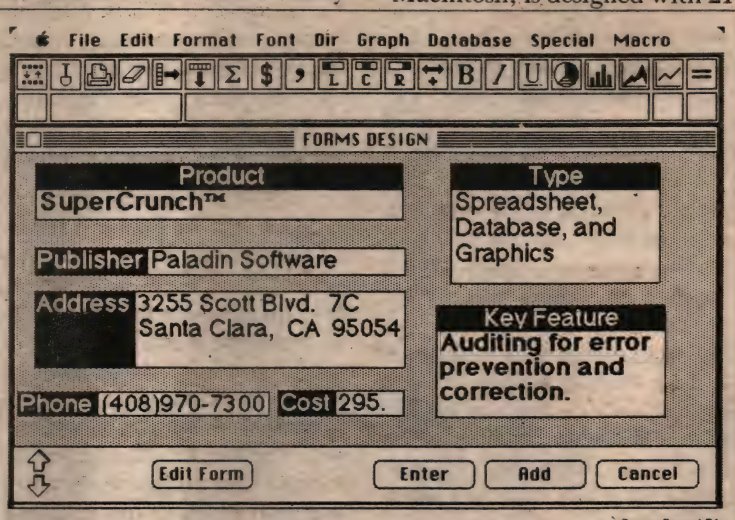
Super Crunch is the only Macintosh spreadsheet with 250 available worksheet levels. Different levels can be used to keep separate records of "what if" analyses, or to create multiple copies of a standard report such as a monthly expense sheet. Different levels can be automatically consolidated into one. For example, several department budgets can be summarized into one budget representing the total division.



Super Crunch is the only Macintosh spreadsheet program with a full range of auditing features, called "Say It", gives Super Crunch the ability to talk. After a user enters a set of numbers the Super Crunch voice can "read" them back for checking against the original entries. Entry checking is now a one person job.



With two clicks of the mouse you can create one of six different types of graphs: bar, line, area, pie, exploding pie or hi-lo close (stock market) graph. Graphs can be easily customized to add a title, text for the X and Y axes, to change the fill patterns of the graph, etc.



Super Crunch offers sophisticated database capabilities including an easy-to-use "forms entry" feature. With forms entry, a user can customize forms such as customer lists, or inventory recoreds, so a less experienced computer operator can easily enter data by filling in the blanks. Similar forms can also be printed out from the data base. For instance, usinng Super Crunch, a user could create a database of accounts receivable and then generate an invoice ffor each account.

CRUNCH™ and SUPER CRUNCH™
Feature Comparison
October 30, 1985

CRUNCH	SUPER CRUNCH
21 Icons	63 Icons: ● 38 predefined ● 25 icons for Macros ● ability to design icons ● ability to move icons
250 col.X9.999 rows	250X9.999 ● Plus 250 levels of worksheets deep
74 built in functions	120+ built in functions Added: ● 12+ string ● 8 Date ● 5 Table ● 6 Time
Recalculation	TURBO recalc (recalculates selected cells, smart)
Graphics 4 types	Graphics 5 types: ● Added Hi-Low close ● Exploded pie charts
Database	Added Database Features: ● Cross tabbing ● Forms design
Audit ● Show formulas ● References - report ● Audit Formulas ● Worksheet notes	Added Auditing Features: ● On screen-references ● Audit dependencies - on screen and report ● Check entries (speech output) ● Cell notes
15 Formating options	Added formating options: ● supress zeros ● 6 time formats ● 8 new date styles
Fonts - 12	Unlimited fonts: ● any font ● any size
Linking	Improved with linked ranges
Printing ● Sideways	Added printing options: ● Page breaks ● margin settings ● headers ● preview printing ● grids without column and row headers

icons, or pictorial symbols, residing on one icon bar on top of the screen. These icons represent common spreadsheet functions such as adding commas or dollar signs to numbers. To use an icon, a user just points at the icon with the mouse and clicks. Super Crunch will have a total of 63 icons on an icon palette, and the user will be able to mix and match these icons selecting which 21 icons will reside on the on-screen icon bar. This means that Super Crunch users will actually be able to customize the icon bars to best serve their individual needs.

In addition to keeping the predefined icons from Crunch, Super Crunch will have a number of new, predefined icons which represent functions such as summing a row of information or cutting information from one spreadsheet and pasting it in another. Other Super Crunch icons will be used to represent a given macro. Users will no longer need to remember a name for each macro, or which menus to pull down, because executing a macro on Super Crunch is as easy as point-and-click. Furthermore, users of Super Crunch will be able to redesign the appearance of the predefined icons, so users can truly tailor Super Crunch to meet their individual working styles.

Super Crunch Macros

Super Crunch offers two kinds of macros, "learn mode" or recording macros, and programmable macros with a built-in macro language much like Pascal. In learn mode, Super Crunch captures keystrokes and mouse movements enabling a user to record a sequence of activities for later replay. Programmable macros will be ideal for the more sophisticated user who wants to create custom or turn-key applications. Super Crunch's programmable macro language will be the most advanced macro language available in a spreadsheet package, and includes commands such as: go to; begin-end; return; leave; call; number; if-then-else; and for-do.

Super Crunch is 3-Dimensional

Super Crunch also offers a unique, 3-dimensional (3-D) approach to the problem of linking different worksheets together. Like Crunch, Super Crunch is 250 columns by 9999 rows, but unlike Crunch,

continued on page 92

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FOR 3½" MAC DISKS!
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Cat No. UNIFILE36

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UNIFILE-75

Holds over 75 5¼" diskettes!

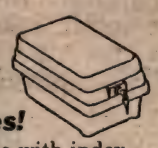


Complete with index dividers and flip-top lid. Similar to the "Flip-n-file". Smoke-colored tough plastic construction. 6.5 x 10 x 6.5h.
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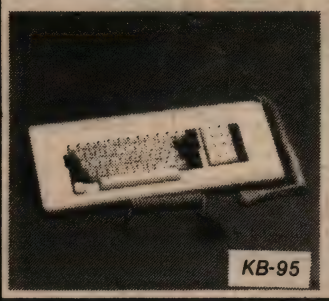
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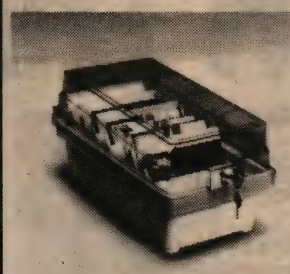
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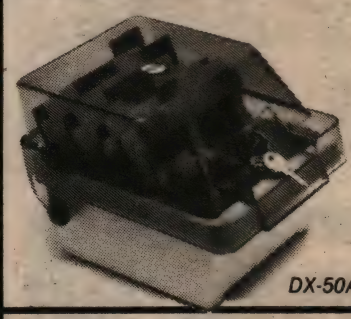
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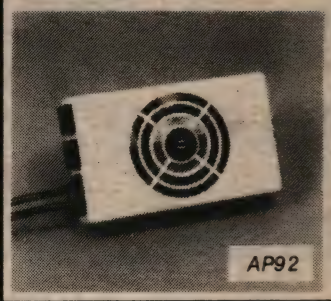
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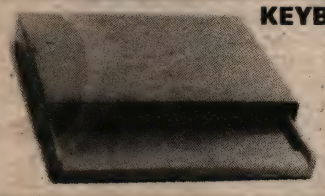
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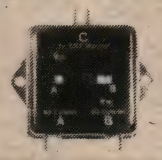
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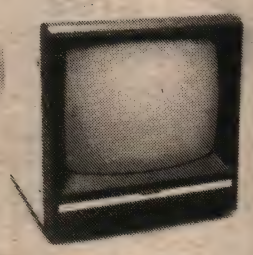
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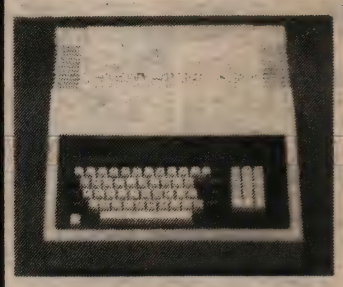
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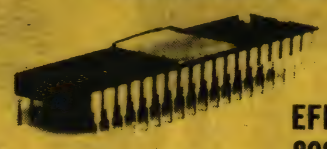
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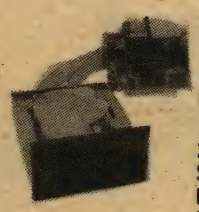
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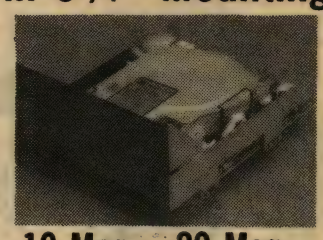
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Basic Robotics And The Commodore 64

by Dr. Al Koller, Jr.

Whoever said "the only difference between men and boys is the cost of their toys" must have known about computers and robotics! And although I'm not really into electromechanical marvels, the *Stepper Motor Learning Guide* from Micro Interfacing Company (MICOM) certainly intrigued me. At $54.95 it isn't exactly cheap (hence, men's toy, not boys'!), but then, there is quite a lot included at that price for anyone interested in linking his computer to a "robot."

At the heart of most robot devices are a means of moving a mass (in this case, a stepper motor) and a control device (your Commodore 64 computer!). The completed product can be much more complex, with sensors and communications, but the basics are all pretty much the same. It is the way in which movement and control are achieved which makes a unit either versatile or single-purpose, costly or inexpensive. The computer controlled stepper motor offered by MICOM includes a precision stepper motor operated at 12 volts D.C.; a control interface which connects to the C-64 through the User I/O port; and a disk containing several programs for testing the unit and programmng your own sequences directly. A 57-page user's manual provides straightforward, complete instruction on the hook-up and check-out of the unit as well as a good description of the theory of stepper motor operation; a description of machine language programming (not required to use the system!); and a series of "laboratory" exercises suitable for training a user in elementary robotics or for use in a science classroom at the advanced high school or junior college level.

Following the step-by-step instructions provided in the manual, my system was connected and running in about 10 minutes. Most of that time was required to find a suitable 12 Volt D.C. source. As it turned out, I had an old lead-acid storage battery used for our boat, and I hooked it up using the leads provided with the interface card. The card plugs directly into the User port (where most of us use a modem), and the motor is already wired directly to the interface with a three foot electrical cable. The motor is a small Hurst Bifilar unit which can develop up to 25 ounce-inches of torque at 175 pulses per second. It is housed with a rather large gearbox, so that the complete unit is about 3" x 2" x 2" deep, with a 3/4" x 1/4" hex drive shaft. It is a precision motor, with movement controlled exactly at 7.5 degrees per step at the motor and 0.375 degrees per step at the drive shaft. That equates to 960 steps per one revolution of the drive shaft, so that quite precise positioning is possible.

The key to using this unit is the buffered interface for the C-64 and the very nice programming provided on the disk supplied with the system. The interface is a quality printed circuit board with four output transistors, eight resistors, four diodes, a Motorola MC14050B chip, and a standard edge connector. The circuit theory is described in detail in the manual, along with a schematic diagram. The disk contains a test program which provides early and very simple checkout of our unit. Within the first ten minutes I had installed and tested the unit, and moved on to programming my own movements using the very friendly user-prompted sequencer program also provided on the disk. A total of 50 individual motor sequences can be programmed using the routine as it comes on the disk, including the number of steps, direction of movement, time between steps, and pause between sequences. Since the programs are in BASIC, and the listings are all provided as appendices to the manual, the user can make changes as he becomes more familiar with the programming, and more than 50 sequences are possible. Also provided on the disk is "Micromon," a machine language monitor which allows direct addressing of the C-64 in machine code.

Table 1 shows the test program as it appears using the <D>isplay option on the main menu. The user can choose to view the program on screen or can dump to the printer. This is true also of the "Robotic Programming Language (RPL)" program which will prompt you sequence by sequence through your own design and allow you to view or print the result, edit the program, insert sequences, save the program to disk, and run the program. Also included in the main programming menu are functions to load a program from disk and return to BASIC. Each of these options is covered thoroughly in the text, although they are nearly self-explanatory. Most users will need only one brief session with the manual to be able to program the stepper motor with ease. Micromon is available for the serious hobbyist, but users like myself will never need it. Table 2 is one example of a program I "wrote" using the prompted menu system in RPL in about two minutes. I discovered that one must be careful, or some very long sequences can be programmed and must run to completion before the system will "reset." See line 7 in the table, for example. Without knowing it, I programmed the motor to run 4000 steps with 400 milliseconds delay between each step. If each step took one millisecond (one thousandth of a second), the routine for step 7 would take 4000 x 400/1000 or 1600 seconds! That's more than *26 minutes!*

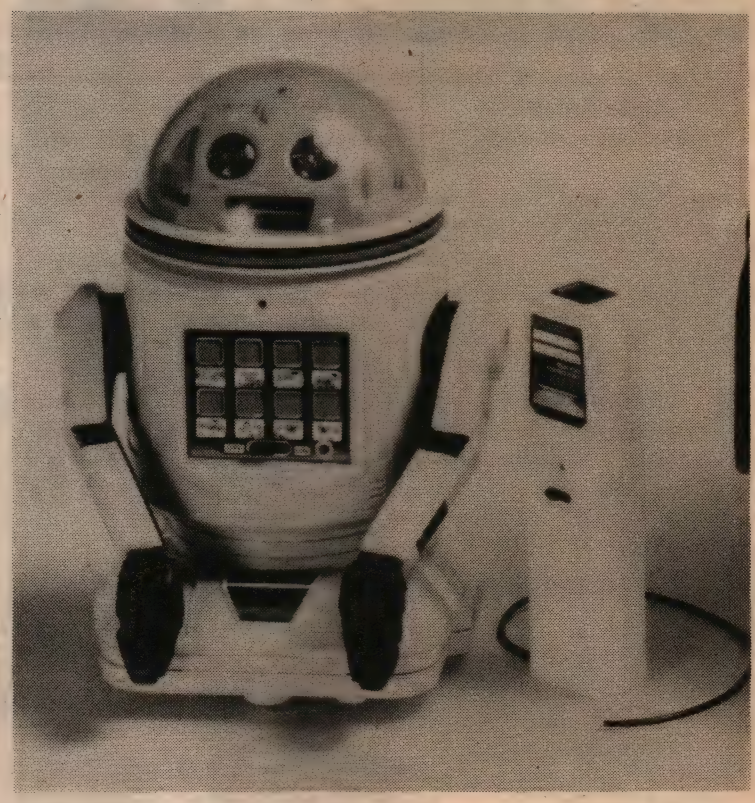
To test the torque (or strength) of the motor, I tied a one pound box to a string and suspended it over the edge of the computer stand, then ran a sequence to move the box off the ground. Remember, this system is built for precision, not real power, but it lifted the box without any hesitation, and it set it back down just as nicely. After using the system for over an hour of continuous

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Probots and People

by Tim Knight

The personal robotics industry has certainly seen a lot more failures than successes. Casualties (and near-deaths) include Androbot, RB Robot Corporation, Hobby Robotics and Amarobot. To reassure those of us whose faith in the industry has no bounds, there has been one company to reassure us which *has* profited from robots for the home - Tomy Corporation.



Tomy is a large Japanese toy company which does very well in the United States. Most of its products are geared toward young children, but a small portion of its business is aimed at buyers of sophisticated toy robots such as Omnibot, Dingbot, and Verbot. The Tomy line of robots has expanded from three to eight in the course of a year, and it's likely that more robots and peripherals are going to be introduced in the future, since the public continues to buy up Tomy's products at a very healthy rate.

Dingbot and Friends

The smallest of Tomy's robots are, without a doubt, toys. Costing between $10 and $40. These little robots are based on simple electronics and are a lot of fun. They are:

Flipbot - This is a little robot you literally cannot keep down. He moves along, swinging his arms carelessly, just waiting for someone to push him over. When he does fall, he will flip himself right back up to continue on his way. His mouth can also be opened to insert messages for him to carry.

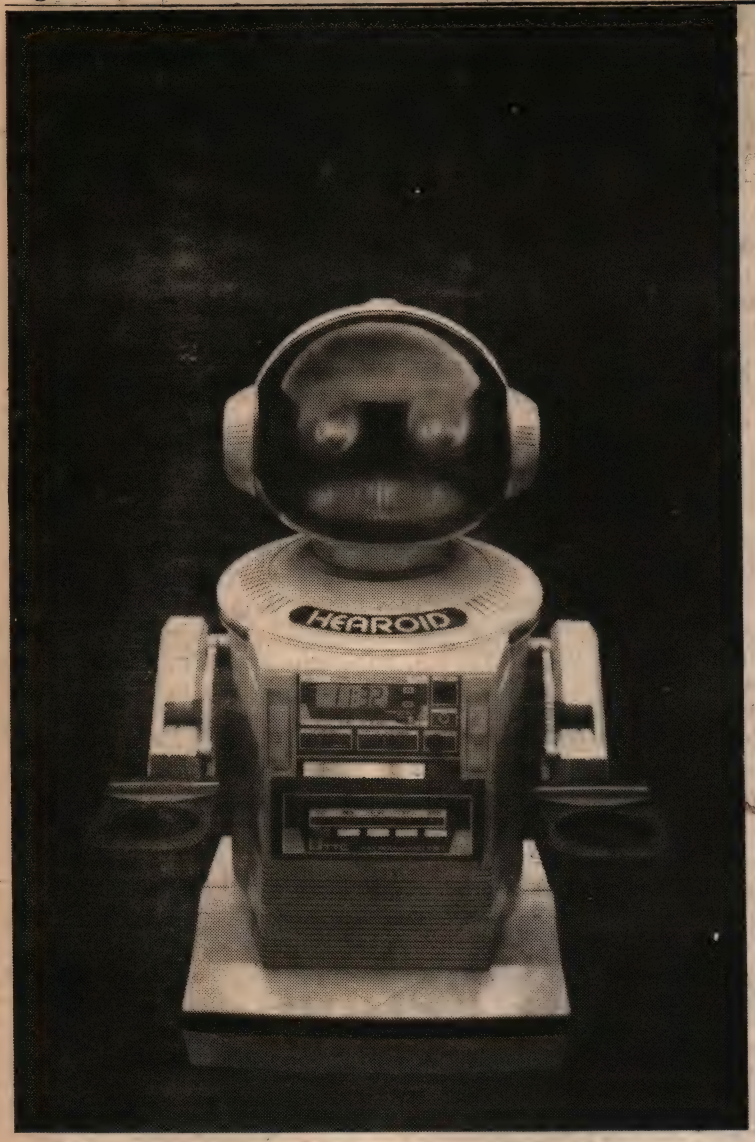
Dingbot - For those of you who think you're always lost, here's a robot for you. Dingbot moves around an area, his feet moving backward and forward, while carrying a map to get him to his destination. Every ten seconds or so, he'll stop in his path and look left and right, sounding off a shrill whine, as if he's upset that he can't find his way around such a big world.

Spotbot - Dog lovers will get a big kick out of his robotic pet. Spotbot moves along and, when he bumps into objects, runs away yapping. He also sometimes chases his tail.

Hootbot - This little owls sits on his perch while flashing his eyes, flapping his wings, and tapping his feet. If you take him from his perch, he waddles away.

Chatbot - Controlled by a wireless remote control, Chatbot can record and deliver a 30-second message to whatever location you send him. You can tell him to go forward, activate the message, or pivot on his axis

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to change direction.

Each one of these toys are a lot of fun for those who have a soft spot in their hearts for robots. They're certainly not a major influence on the personal robotics industry, but they do create more interest in robots because they look and behave like intelligent machines themselves.

Verbot

On a somewhat higher level of sophistication is Verbot. As the name suggests, this robot is voice-controlled. You can tell him to go forward, backward, left, right, pick things up, put things down, stop, or "smile" (flash his eyes and mouth). At a cost of only $60 retail, it's understandable that the voice recognition is not perfect; in fact, it probably has only an 80% recognition factor. He's reliable enough for his purpose, though - to have fun with a wireless remote-controlled robot by using your voice.

Programming Verbot is easy enough. You simply press the button on Verbot corresponding to the function you want to program (for instance, going forward). While holding down the button, you would say whatever you though it would be an appropriate command, like "proceed forward" or "go ahead." Once the light on Verbot stops flashing, he has recorded the spoken command in memory and will (hopefully) recognize it through your handheld microphone control until you turn him off, at which time he'll forget all he has learned.

I've learned, after programming Verbot dozens of times, that I need to make my commands very distinct. If you use "forward, backward, left, right, smile, stop, up, down" for your commands, you're going to find Verbot doesn't pay much attention to you since the one - and two-syllable commands could be so easily confused by his simple voice recognition electronics. I have finally devised commands which seem to bring the best results when using Verbot. If you have a Verbot now or you are planning to get one, you might want to remember them. They are:

(1) "Stop!"
(2) "Smile, Verbot!!"
(3) "Proceed forward"
(4) "Travel backward"
(5) "Rotate left"
(6) "Turn to the right"
(7) "Pick up"
(8) "Put it down"

Verbot is a good way to learn about the challenges of voice recognition. He's also a lot of fun, especially since some companies have come out with "add-ons" such as basketball and bowling games you can play with Verbot. Don't count on too many strikes, though, since he doesn't always listen.

Omnibot and Omnibot 2000

The top-of-the-line robots from Tomy are the Omnibot and Omnibot 2000. Omnibot has been around for well over a year, and Tomy is not telling how many of the $250 robots they've sold. However, the Sharper Image mail order company is rumored to have purchased nearly 50,000 of them. Omnibot's older brother (introduced in September 1985) is Omnibot 2000, and he costs about $500.

Omnibot is controlled via a remote unit that can tell him to go forward, backward, left, right, make sounds and flash his eyes, or start and stop his cassette tape. In addition, you can speak *through* him somewhat like a PA (public address) system. The built-in cassette deck can play music through Omnibot's on-board speaker, and he even has his own tray on which he can transport drinks and snacks. This robot is easy to program since you simply put a cassette tape into his deck, press PLAY and RECORD, and proceed to command Omnibot with the remote control. He will remember all of the motions, sounds, flashing eyes, music, and spoken words you send his way via the remote control, and this "program" can be played back at any time. With a long cassette tape, you could make a program that lasts for a full 45 minutes.

Omnibot looks somewhat like an R2D2 with arms, but he can't do quite as many tasks; he can wake you up in the morning with his pre-programmed timer that can be set up to seven days in advance with up to three alarms, and he is also an entertaining "butler" at parties. However, Omnibot is little more than a sophisticated electronic toy which looks like a robot and can perform a number of interesting functions.

Omnibot 2000 is a much more exciting creation. Standing 26 inches tall, the 2000 features a motorized head, flashing headlight-eyes, and the ability to move in any direction at either of his two speeds. He has all of the features of Omnibot (a tape deck, preprogrammability, and so on), but the two big features which make the 2000 so special are his accessory panel and his motorized arm.

Omnibot 2000's accessory panel allows him to play music through an external speaker and function as a 6-volt power source for small appliances. In addition, peripherals including Tomy has introduced a line tracer which allows the 2000 to follow a line you draw, a video camera so you can see on television what Omnibot 2000 sees, and a sonic sensor. These can easily be plugged into the 2000's accessory panel.

Omnibot 2000's arm is probably the biggest leap forward Tomy has taken with their robots. It can move up and down, the wrist can pivot, and the fingers can grasp and release. With the motorized tray, which can actually bring glass to the hand, Omnibot 2000 can easily pick up a beverage, pour it into several glasses, and serve each glass individually. The Omnibot 2000 is easy to control with the remote control, and it's just as simple to program as the Omnibot.

Hearoid and TTC

Tomy has no intention of becoming a personal robot company. Despite the success of their robot toys, Omnibot 2000 is probably just about as sophisticated as Tomy's robots are going to get for a while since Tomy would like to stick with the business they're best at - toys. However, they do have an interest in the increasing

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movements, there was no noticeable heat build-up in either the motor or the interface board. The system is virtually noiseless and vibration free, making it ideal for close-tolerance work.

So, what could such a gadget be used for by the average computerist? Well, first of all, it is an ideal system for teaching the basics of electric motors, simple circuit design, man-machine interfaces, and even some basic programming. It will build confidence and capability very quickly, and it could work to reduce the fear some people still have over using the computer. But more directly, this unit is suited best for applications requiring very accurate location and very close control. One application would be the control of a very close tolerance valve, such as a needle valve for fluid control.

SEQ #	PAUSE	STEPS	B/F	DLY
1	0	60	FWD	200
2	500	0	---	0
3	0	60	BKD	3.5

TABLE 1:TEST PROGRAM

SEQ #	PAUSE	STEPS	B/F	DLY
1	0	5000	BKD	10
2	0	2	FWD	30
3	0	3500	FWD	5
4	10000	0	---	0
5	0	400	FWD	1
6	1000	0	---	0
7	0	4000	BKD	400
8	0	0	---	0

TABLE 2: AUTHOR'S "SAMPLE" PROGRAM

Another use would be the movement of small parts or the placement of pieces in an assembly operation with tolerances too close for humans. It might be used as the basic drive motor for a robot control arm as a demonstration device, and the kit can be augmented with an add-on card and an additional stepper motor to "drive X-Y positioners, a computer-controlled mouse, or build any number of projects requiring two independently driven stepper motors," according to MICOM. The cost of the additional hardware is $49.95.

The MICOM Computer Controlled Stepper Motor Kit is a quality unit which will make a fine addition for those interested in exploring computer-controlled devices and/or robotics. Although it is not likely to be the most sought after "peripheral" for most Commodore 64 users, I know of no better unit for the classroom and the serious hobbyist in need of a first class drive unit. Combined with a good old fashioned "Erector Set," it might well make an ideal Christmas gift for getting father and son into computers and robotics together. Happy Holidays!

The MICOM Computer Controlled Stepper Motor Kit
Micro Interfacing Company
P.O. Box 169
Valrico, FL 33594 ●

SANYO

Silver Box

by Richard Fujita

Notice: The opinions in this column are completely those of the author and are not the opinions of *Computer Shopper* or it's staff.

Which Diskettes For You?

Recently, I went to a nearby discount shop and bought four boxes of DSDD floppy disks. Now, I own four brands of very recent manufacture; three brands bought early in 1985; and another four brands bought since 1982. If you examine these eleven different lots of diskettes, you may find some significant differences.

I assess the quality of disketes with three criteria;

1. Mechanical Construction, 2. Magnetic Performance and 3. Head-Wear Factor. The first criteria refers to how well the diskette is made mechanically. I never had even a casual doubt that any diskette I bought might fail to perform due to dimensional or other mechanical defects. However, two important things I pay attention to is the hub ring and the friction torque.

NOTE:

1. Motor current is the average of five diskettes tested.

2. Output level is measured at the output of Analog head amplifier.

3. High output fluctuations suggest center hole seating problems besides magnetic coating characteristics.

4. Surface evaluations are abbreviated as "B" for bad, "M" for intermediate, "G" for good, "VG" for very good, "E" for excellent, "S" for super.

5. Motor current tends to decrease after few hours of continuous disk rotation.

The Hub Ring

The hub ring is an important part of the disk. It must be able to withstand unwelcomed but possible abuses by an inexperienced operator, who puts disks in and out of drives even when the power is off, or who put disks halfway in and pushes down on the lever with one hundred pounds of pushing force trying to shear off a good extra quarter inch off the center hole! Without a good hub ring, these operations will certainly damage the center hole in a short while and displace the tracks, resulting in the total loss of your files on that disk.

A good hub ring is a good insurance to have, but there is a trade off. As far as I know nobody has ever warned users of the hidden problem of having the hub rings on your diskettes, that is the problem of dimensional accuracy. The hub rings are hard plastic and therefore they need space between the hub rings and the spindle for smooth release. In addition, the disk requires several times better flatness on the inside surface of the hub ring than on the disk materid, otherwise, the diskette might stick to the hub causing the hole area to deform. With a soft hub-hole, like that of a Fuji diskette, the tolerances can be reduced for better seating accuracy. This may be the reason why Fuji engineers opted for no hub rings. The Fuji diskettes tested show remarkably low output fluctuations.

If the diskette is not precisely centered on the spindle hub, the output of the magnetic head varies linearly from low to high and high to low as the disk makes a single complete turn. (If the output has two undulating variations per each turn, like that of the Kodak diskettes, this means the magnetic coating may have some degree of particle orientation like the one meant for tapes rather than disks.)

Friction Torque

The friction torque is a very important characteristic of a diskette. If there is a lot of friction required to turn the magnetic disk inside the jacket, the motor is required to output lots of power, drawing a larger current flow through the drive coils than is necessary for a diskette with less friction.

In the case of the Sanyo 550 series of computers which are known to have a limited power and cooling capability, this torque characteristic of the diskette is as critical as the drive motor specifications. Some disk drives draw less than 150mA each when using a good diskette, but with high drag diskettes they may draw as much as 700 mA each. This helps to bring about overheating conditions in the drive. One good thing about friction torque of a diskette is that it usually improves with use.

The current draw characteristics of eleven different brands of disks are shown in the List 1 with other data.

The Recording Surface

The second criteria refers to the magnetic property of the recording media and integrity of the recorded data, and the third refers to the head life of your disk drive. If the wear factor is high, your drive may need replacement heads early in its life, which might cost more than the price you paid for the drive itself.

The rule of thumb is that the higher the level of polish the diskette recording surfaces has, the lower the head-wear factor is low, and, in general, the maximum bit recording density is high. If the polish is as mirror-like as that of the Fuji diskettes, the head wear is generally minimal, providing no foreign matter has been deposited on the surface of the disk and providing that the surface has not been scraped by a damaged head, or by some hard foreign particles.

Cerium Oxide Cure

The head pads of a drive often get contaminated, especially when the drive is used in the horizontal position. Siliceous particles (just plain dirt) or combustion residues (I mean tobacco ash and tobacco resin both of which increase drag) often becomes air-born and are deposited on the horizontal surfaces as dust in every human habitat environment (I mean any house or office).

In single sided drives, nearly every time when you leave the cover open for a period of time with a disk in the drive, and especially when the drive is mounted horizontally, the pad will be contaminated when you start it without due care, and it can scratch the pad side of all the disks you run in this drive. You should not try to use any disks scratched this way in the double sided drives. I have bad scratches on nearly one half of all my 8" disks caused in this manner.

The damage was not apparent to me until I got the double sided drive five years later in late spring of 1985. I should have been more attentive and careful, but when I put these disks in the new drive and started formatting, the heads made strange scraping noises and started to produce numerous errors. Then the drive stopped responding to commands and it took me a good half-day to put the drive back in service.

The top head needed total cleaning and polishing with cerium oxide powder. The diamond micron powder can finish the surface quickly but I believe the cerium oxide will give better polish with less worry. The diamond powder is somewhat abrasive.

When you have a scrape or two on your head surface (often described as crashed), or, if the head has been in heavy use, the head surface could become rough. **Note: *Computer Shopper* does not recommend that the average user attempt to clean disk drives without use of cleaning kits approved by disk manufacturers.** You can polish and recondition the recording surfaces with a minute quantity of the fine cerium oxide polishing powder sprinkled on the cleaning diskette, and running it for 10 seconds or more depending on the roughness of the surface.

You should clean the head with Q-tips moistened with a small quantity of alcohol and test often as you go. This operation is often called resurfacing or head reconditioning and costs you several ten dollar bills in the repairmen's shop, which is a reasonable charge compared to some rip offs because the job requires several testing sessions and several complete cleaning operations besides polishing.

I wish to give some help to people with mechanical ability. The cerium oxide power is good for several head polishing operations is within your reach if you send me a SASE, c/o *COMPUTER SHOPPER*, available for the first 20 people to apply.

The Disk Surface

By this time you should be aware how important is the polishing on the disk surfaces. This is one measure to evaluate the quality of a disk. (Personally, I examine all the recording surfaces of diskettes I buy with a 50X microscope.)

The disk surface is a composite of the binding material, the cement which binds the magnetic particles to the substrate, and the magnetic particles which will magnetize when written to, and which will induce a magnetic field in the heads when being read.

The residual magnetic strength after the writing operation should be high to produce the strongest possible magnetic field in the head,

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LIST 1. 5.25" DISKETTE TEST RESULTS

TEST CONDITIONS:

USED DRIVE:- TEAC 55BV-U

COMPUTER:- SANYO 555-2

TEST TRACK:- TRACK 39

BRAND	(DATE)	MOTOR CURRENT	OUTPUT LEVEL	FLUCTUATION	POLISH	FLATNESS
3M	(1981)	130 mA	290 mV	16 mV	B	G
3M	(1983)	137	331	14	VG	VG
OPUS	(1983)	104	326	8	M	M
IBM	(1984)	192	325	10	VG	M
OPUS	(1985)	139	338	5	VG-E	S-VG
DLIFE	(1985)	110	286	28	M	M
MAXELL	(1985)	123	322	16	M	E
FUJI	(1985-1/2)	141	299	2	S	E
KODAK	(1985-1/2)	143	337	18(2 DIPS)	S	S
PINN.	(1985-1/2)	159	328	15	S-VG	S
SCOTCH	(1985-1/2)	112	315	10	VG	S

NOTE:

1. MOTOR CURRENT IS THE AVERAGE OF FIVE DISKETTES TESTED.
2. OUTPUT LEVEL IS MEASURED AT THE OUTPUT OF ANALOG HEAD AMPLIFIER.
3. HIGH OUTPUT FLUCTUATIONS SUGGEST CENTER HOLE SEATING PROBLEMS BESIDES MAGNETIC COATING CHARACTERISTICS.
4. SURFACE EVALUATIONS ARE ABBREVIATED AS "B" FOR BAD, "M" FOR INTERMEDIATE, "G" FOR GOOD, "VG" FOR VERY GOOD, "E" FOR EXCELLENT, "S" FOR SUPER.
5. MOTOR CURRENT TENDS TO DECREASE AFTER FEW HOURS OF CONTINUOUS DISK ROTATION.

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when read. So, it is necessary to use high-bias, high-output magnetic particle coatings which usually have a dark color. Some manufacturers use metal particles, others use ferrite or chromium dioxide, or combination of all types.

The magnetic particles cannot be smaller than a certain size. If they are made below micron size they tend to lose good magnetic characteristics. Each magnetic domain (the elementary magnetized particle) must have a certain minimum size.

They cannot be made flat unless you lay the magnetic alloys flat on the surface by sputtering it in the vacuum. The magnetic layer produced this way cannot be used in a floppy disk because it reacts with many materials and scrapes off easily.

The best compromise, it seems to me, is a mixture of magnetic particles of minimum domain size and binding material, plus a filler which strengthens binding cement and produces good wear characteristics. The filler is a very important component to obtain and maintain good polish during the entire use-life of the diskette's recording surface. A small part of the filler compound could be a solid lubricant such as graphite or molybdenum disulfide to reduce the friction and prolong head life.

Since the magnetic particles have irregular shapes when they are produced in chemical and thermal process, you cannot make a flat, smooth surface with good recording characteristics without polishing it. The requirement is similar to producing a videotape. Indeed, the mass produced videotapes gave a tremendous improvement in the data recording field.

Dropouts And Wear Factor

You must be informed, however, that diskettes most often fail in two areas , the dropout test and head wear test, which are beyond the capabilities of anyone without a well-equipped lab. To test these characteristics of diskettes you must record all the tracks with a sine wave at the highest frequency the disk is expected to handle and read it back to see if the recorded sine wave is continuous and without any moment of dropouts.

To test the real head-wear factor, you mount a head of known mass in the test drive, read and write for several hours, retrieve the head as intact as possible and weigh it to microgram accuracy. Then you will know how much head surface you lost. Then take a new head and wear it down on a lapping table with diamond powder in the same angle and head pressure as in a drive until precisely the moment the head ceases to function and you weigh it to see how much surface the head has lost in micrograms. Then you will know absolute life of a head on a particular diskette with a simple calculation. You should repeat the procedure several times for reliable results. (You must use real heads in this test to get the real data. Who said I should substitute the head with a glass rod?)

For these tests you require a special test setup to pick out all the dropouts if there is any, a few new heads and a precision electronic scale. I can probably assemble all the hardware and imprement and carry out the test in about a week of concentrated effort with an estimated cost of perhaps $4,000.00 to $20,000.00 or more depending on how I handle the operation. This is way beyond the scope of this column and outweighs my expected benefit of possessing such information in buying a few disks I need.

More On The Brands

From the List 1, a clever reader can draw conclusions which brands of diskettes are most suited for the 96 tpi applications, regardless of the manufacturers' grading and claims. I suppose you can pick easily which DSDD disks are the better choice than some diskettes labeled as DSQD to use in your Silver Fox, or in my Silver Box with but one 80 track drive paired with a common place 48 tpi drive.

The reliability and data integrity of the diskettes chosen this way, based on the similar test as shown in List 1 I performed last year, have been simply just impressive. I have never experienced any disk error or format failure in more than 14 months of daily use. I never had to buy even one DSQD disks thanks to the recent improvements done on the magnetic capability of floppy disks. (Did anybody try to reduce the spindle speed by factor of 2 and cram 20 sectors in each track?)

The final description and evaluation of each brand of diskettes tested for applications in 48 tpi and 96 tpi drives plus some explanations how to interpret the results in the List 1 will come in the next issue of the *COMPUTER SHOPPER*.

More On Power

WARNING: The following is for information only. Neither the author or *COMPUTER SHOPPER* recommends that anyone make any modifications to a power supply and we are not responsible for any damage resluting from such modification. Observe all electrical safety warnings and remove all power before touching power supply.

I received a very informative letter from a reader of this column how to increase the current output capacity of the original power supply. He reported that he had many read errors and after two modifications the errors have diminished. I will describe these remedies and tell you what these changes will bring about and what you should expect from them.

The first modification involves changing of the current limit divider resistor, R5, from 64 ohms to 82 ohms and the base resistor, R4, from 2.4K to 1.0K. The new current limit resistor will increase current limit point from 4 amps to 5 amps, and could be very effective if your problems were occasional excursion of peak current beyond 4 amps.

The new value of R4 will increase the base current of the switching transistor and presumably enhances the current handling capability of the power transistor by reducing the collector to emitter saturation voltage during peak current conduction. I made the change and observed the switching waveform on my scope at 4.5 amp current load on the 5V line. There were no discernible changes in the switching waverform. I think changing R4 value is not necessary.

At this point I should warn my readers that whenver you make any modifications in the power supply, you are on your own and you void all warrantees. *COMPUTER SHOPPER* does not recommend that you attempt to modify your power supply and is not responsible for any damage resulting from these procedures.

Testing Is Important

When you make any changes in your power supply, you should test it carefully with dummy load resistors before reconnecting it to your system. For testing the Sanyo power supply you should use 1.6 ohm, 20W, wirewound resistor for the 5V line, and 12 ohm, 12W, wirewound for the + 12V line.

Remember, a little smoke signal can go a long way beyond your imagination. If the raw DC is somehow allowed to flow into the logic power line, you may have to replace not only the CPU board and all other add-ons but the drives as well.

For Casual Users Only

The net result of modifying current limit value can be satisfactory for some occasional users with a streak of elevated uncertainty of an impending catastrophic failure destined to take place tomorrow or 99 years from now, because the power supply was not designed to take a 5 amp load and the design of the power supply will allow this dismal result to happen when the power transistor shorts out.

During disk access the current demand on 5V logic power increases and often produces error condition if your system is pulling more than 3.6 amps at rest. If you are a casual user and if you use the Sanyo for less than two hours each time you use it, this modification may be a good solution. In short sessions, the heat rise inside the computer may not be high enough to affect the operation of disk drives during the summer months.

However, if you are a serious user and if you have installed or are planning to install add-ons, such as the color board, 8087 match chip, the serial board, the internal hard disk system, the memory expansion, etc., the heat generated inside the cabinet may be a problem. To be sure, you have to mount a fan on the back of the computer, or otherwise modify the cabinet for good cooling as I have described several months before. I also recommend to use external hard disk rather than internal, based on thermal considerations.

The bottom line for the current limit modification is that this works for casual users only, and if you do take this approach, the addition of a crowbar, which shorts the line whenever the voltage goes beyond 6.5V, to the 5V output may be a good insurance to protect your investments.

A Crowbar?

The problem is, crowbar modules are no longer available on the market since most of power supplies available now come equipped with it, or with a voltage limit latch if it is a switcher. The latter approach does not work with Sanyo power supply which uses a switched pass transistor to regulate output voltage. This design has a risk. When and if the power transistor is shorted as I mentioned before, the raw DC at about 20 volts or more will appear on the 5V power line frying and burning every chip in the system.

In an ordinary switcher, the circuit blows the fuse and no voltage will appear on any of the outputs if the power transistor shorts out. This is one other reason which I did not explain before why I replaced the power supply with a switcher having a voltage limit latch built in the regulator chip.

Heat Sensitive Drives

A company is selling a modification kit which includes a 5V three terminal regulator which is wired into the + 12V power output. The output of the three terminal regulator is hooked up to supply 5V power to the drives which are cut off from the main supply.

Again, this is a good solution to the casual users only. The additional drain on the + 12V three terminal regulator increases the heat dissipation and produces more heat than increasing the current capacity of the switched 5V power output. The additional heat dissipation may result in causing some read errors during hot summer days. The drive is a temperature sensitive device, while the disk controller chip, 1793/8877, probably is the most power voltage sensitive chip in your system.

The conclusion, reduce heat source inside the cabinet as much as possible and provide more air into the box. It may require installation of a larger transformer or a new power supply. Another suggestion is to replace the drives with the new TEAC 55VC models which have somewhat lower current drain than older models as shown in this column last month. This might work if your add-ons are limited to color board and serial board only with RAMS installed to 256K.

In my opinion, this modification which increases thermal loss at the rate of 20W per each amp may not be necessary if you performed the current limit modification which is better in terms of thermal consideration. If it did not eliminate problems, you must have a new power supply.

Sanyo And Sidekick

I should admit I made a blunder in this column last month. I saw a Sidekick name in the compatible list compiled by Sanyo and I automatically included the name as compatible. It was a mistake. I purchased a copy about ten days ago and you know what! It does not run at all in my Silver Box with the color board because the Sidekick Version 1.56A interfaces very intimately with the IBM hardware and not through the DOS nor BIOS. I assume it needs a very extensive patch.

Although it runs on my other computer, but, I hate the imitation IBM style keyboard and consequently I am very reluctant to write on that machine even though my Sidekick is waiting for me there.

Errata On Turbo Patch

Unfortunately there was one line missing from the TURBO PASCAL patch assembly instruction printed in this columnin the October issue of the *COMPUTER SHOPPER*. Please insert "MOV AH, 09," which tells the BIOS to print a string, after "MOV BL,AH," at the location 51AF. If your patch did not work, it was my fault. My very sincere thanks to Victor Frank for notifying me of this error. ●

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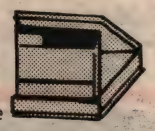
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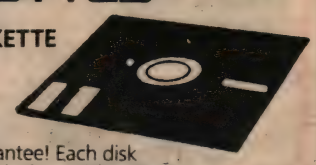
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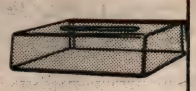


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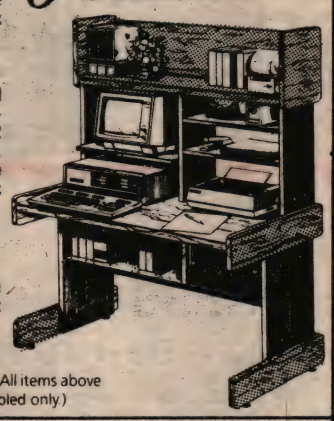


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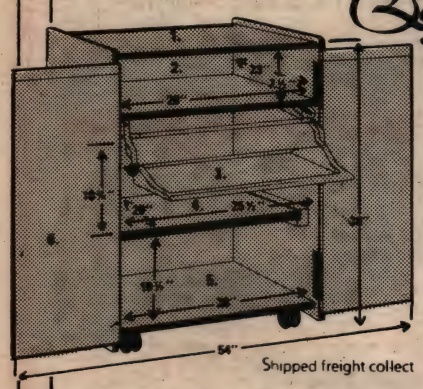
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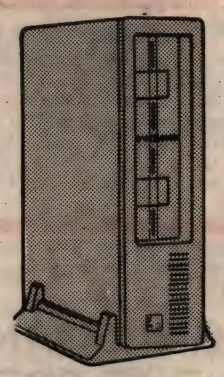


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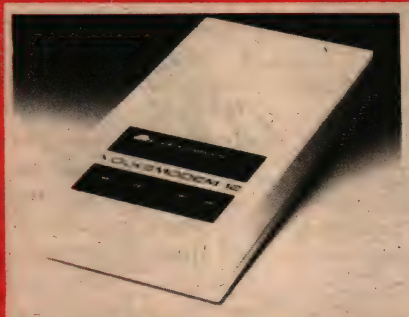
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TIMEX-SINCLAIR

Timex/Sinclair Survival Column

by Mark Fendrick

As we know, the Sinclair community in this country never obtained the status of a Commodore, for instance, and the "professional" software which is abundant for other micros is not as available for us. However, the situation today is not quite what it was when the Sinclair computer first made its debut. At that time almost everybody who owned one of these computers was writing and trying to market software. Many of us did manage to accomplish this, and some of us still keep at it. For the most part, though, the handful of publishing houses whose names are well known (Quicksilva, Psion, etc.) account for largest quantities of software sold. It is not unusual that these publishing houses are in England, where the Sinclair has a better reputation and following. But it seems that the small individual programmers have not all disappeared into the woodwork. Jim Clatfelter is such an individual.

I became aware of Mr. Clatfelter's offerings right here in *Computer Shopper's* classified section. Recently I noticed a new program listed which would make banners on my full size printer through my AERCO interface. Since I had a use for banners of this type, I ordered it from him. This is just one of five programs which he offers. Jim got started marketing software with a program named VIEWord which is one part of a three program package. (Actually, a fourth program is included, but it does not interact with the other three.) When used with MAIList and FORMail, you have mailmerge ability on your Timex/Sinclair 2068.

VIEWord is a line editor type program, which is not hard to learn how to use. It comes ready to utilize either the T/S 2040 printer (or the Alphacom 32 of course) or a full size printer through the AERCO parallel interface. It can be formatted to either 32 or 64 characters per line depending on which printer you will be using. The main menu will always show you what line length you have chosen, and how many lines (total) you may utilize. There is a HELP screen available which will show you at a glance the specially defined keystrokes. These defined keystrokes give you the ability to utilize the TAB functions, center the line, print in double wide characters on a full size printer, erase a line, or send printer control codes.

You do your initial composing in TYPE mode, and can access any of the menu options directly from this mode simply by typing the one character menu selection code. If you need to simply type that same code as one character line in your text, just enter an additional space and the program will understand that is not a command. You may read your document in VIEW mode. In this mode you can navigate back and forth through your text. As with TYPE mode, all menu options are also available here. In addition, you can set your page length to the desired setting, and the page breaks will be displayed as you view your text.

The EDIT mode has seven commands available (EDIT, WRAP, SPLIT, RECALL, INSERT, DELETE, and COPY) which you use one line at a time. Unlike more sophisticated word processors, such as MSCRIPT, VIEWord operates on one line at a time, and that is the key to using the program. Like any new software it takes a little time to learn to fully utilize the commands, but once learned they work well.

In PRINT mode you may set a number of different options if you are using a full size printer. (These do not have any meaning if a T/S 2040 printer is to be used.) You have the ability to automatically set page length and have the document automatically paginated, or you may have the program pause at designated places if, for instance, you are manually feeding cut sheets to your printer. In addition you may indicate your desire to automatically number your pages, and/or have a header printed on each page.

VIEWord comes with a seven page user's manual, including a page describing how to send printer control codes, and one listing the command keys.

The second program in this suite is a mailing list/address book program named MAIList. Like VIEWord, MAIList is made to work with either a T/S 2040 printer or a full size printer connected via an AERCO parallel interface. The program works in a manner very similar to VIEWord. There are four main operative modes (five if you include the SAVE/LOAD mode) similar to those in the previous program. The data is entered in the TYPE mode, and can be changed in the EDIT mode. You may use VIEW mode to read through your list. Labels or a master list can be produced using the PRINT mode.

As with the VIEWord menu, the MAIList menu tells you the current status of your list. Before typing in any names, you will see 0/200. This shows you that you have entered 0 names and still have 200 (the maximum) available. As with VIEWord, all menu commands may be accessed from the menu, TYPE mode or VIEW mode.

Aside from the usual fields allowed (first name, last name, address, city, state, zip code and telephone number), MAIList also allows a three character category code and a comment. This comment may be printed or not printed on our labels depending on how it is entered. Using this comment as part of the address to be printed, you are able to use a four line address on some labels while maintaining a three line address on the others.
The category code allows you to selectively print labels based upon the codes entered. This may denote anything you could possibly think of. This allows you the flexibility of creating unlimited sublists within your master list.

The PRINT mode gives you the choice of either printing a master list for reference. This master list will print with all the data and label numbers. One across labels may be printed on either the T/S 2068 printer or on 3 1/2" x 15/16" labels on an 80 column printer.

While neither of these two programs is extraordinary in or of itself, the third part of the package makes them special. FORMail codes in your VIEWord text to personalize your correspondence. These codes will permit you to enter the date when using FORMail and have it printed on each form letter; permit you to have each form letter printed with the proper inside name and address; allow you to choose from a number of different salutations. You may use the forms--To: First and last name--Dear first and last name--Dear first name. You set the margin, form length, pagination information, date and category (as with MAIList) and then the letters get printed until the entire list is done. Two features I particularly like are 1) the program tells you how many letters will be printed, and how long your VIEWord file is; and 2) the program informs

continued on page 160

2068 Back-Ups On The A & J Mikrodrive

Using Thomas Woods 2068 Profile has proven to be the most convenient data base for our supplier and media contacts. (I've found it even better than Microsoft's FILE for the Macintosh...a $200 fiasco software package.) Using it with our 2068 Mikrodrive (same as A & J Mikrodrive), has further enhanced it's utility with extra speed and reliability in saving and loading. I did, initially, have some misgivings about the Mikrodrive versions because there were no easy instructions for making back-ups. I've since figured a convenient method myself and thought it would be a good idea to share my method with others.

LOAD the Mikrodrive version of 2068 Profile from cassette and configure it as per instructions. (If you plan to use the internal Mikrodrive printer port, you'll need a patch tape from us which we'll supply for $5 to cover costs.) This will give you one blank copjy of Mikrodrive profile. Now, to make back-ups, you'll need to configure a re-usable loader. With no wafer in the Mikrodrive, LOAD the Mikrodrive version from cassette once again. You should get an error report after the loader has loaded. LIST the Loader program to your screen. Now, DELETE lines 1000-2000 from the Loader program. Next, FORMAT a couple of 5-10 foot wafers using the SAVE "@1,+" command. Now, insert one of these wafers and SAVE "@1,pfile." Save the same thing on the other formatted wafer. You have just made a Loader which you'll use to prepare other wafers to save Profile and it's data. Now, Format as many 35ft or longer wafers as you want to have for Profile back-ups. Then, LOAD "@pfile" from your Loader wafer. One by one, insert the formatted back-up tapes into your Mikrodrive and enter the command: SAVE "@1,pfile" LINE 1: VERIFY "@pfile." This saves and verifies an auto-run version of the loader to file 1 of each wafer. You now have a set of wafers that are ready to back-up Profile and its data.

To use these back-ups, you start a file with your original empty Mikrodrive version of Profile. When it's time to SAVE your work, you remove the original wafer and insert one of your prepared wafers. Since the SAVE goes to files 2 and 3, your Profile and data will be readily saved and verified. To make a back-up copy, just SAVE again onto another prepared wafer.

Note: Besides speed, the 2068 Mikrodrive should be consistantly reliable. If you have frequent tape errors, there is something wrong. After a year of no problems, mine started having frequent tape errors. I used a swab and the cleaning solvent from our computer maintenance kit to clean the head and rollers and the drive returned to it's previous reliability.

If any readers are confused or have questions, they're welcome to call or write for help to E. Arthur Brown Co., 3404 Pawnee Drive, Alexandria, MN 56308, (612) 762-8847.

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8. Multi Function, 0K $215

IBM PC/XT COMPATIBLE KITS

1. Mother Board $180
w/ 256K socket, OK
2. Color Graphic Card $95
(320 x 200 graphic code)
3. Monographic Card $125
(720 x 348 w/ printer port)
4. Printer Card $27
5. Teac 55B 360K $85
6. Metal Case $49
7. 135w Power Supply $89
w/ DC Fan, 110v/220v switchable
8. Keyboard $70
(Low profile keytronics 5150 compatible)
9. Floppy Disk Drive Controller $55
with cable
10. 9 pc 4164 150NS DRAM $8
11. 10 MB Hard Disk w/ Controller $395
12. 20 MB Hard Disk w/ Controller $445
13. 10 MB Hard Disk Bare Drive $290
14. 20 MB Hard Disk Bare Drive $370
15. Multi Function OK $125
16. Serial Card $25
17. 12" TTL Monitor $95
18. Irwin Tape Back-up
10 MB $395
20 MB $445
19. Color Monitor $295
(640 x 240)
20. 41256 150NS—9PC $27/set

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TEXAS INSTRUMENTS

How To Buy A Printer

by Stan Veit

Printers costing from $200 to $20,000 probably represent the widest range of prices for any computer related device. How do you pick the right one for your system? What features must you have and which ones are optional "frosting on the cake?"

This article will discuss how to determine what printer you need and how to get the best value for your money. Paying the highest price will not assure getting the best value. Making the correct selection of the best printer for your needs will be the result of thorough evaluation and careful shopping.

Some points you should consider in your selection process are:

* Print Quality--How does the printing look on the page?

* Print Speed--How fast does the machine print? How much speed do you need?

* Duty Cycle--How big is your printing job? How many hours a day is the printer going to be running?

* Paper Feed--What kind of documents are you going to print? In what form is the paper supplied?

* Paper Thickness--Are you going to use multi-part forms or card stock?

* Graphic Capabilities--Are you primarily printing words, graphic images, or a little of each? Are you going to use monochrome or color printing?

* Printer Ribbons And Cartridges--Does the printer require special ribbons or ink cartridges? How much do they cost?

* Where Is The Printer Going To Be Located?--Is noise a factor in the office? How far is the printer from the computer? Can you run the cables?

* How Many Computers Are Going To Be Served?--Is the printer going to be used in a network or will it serve one computer?

* Do you Need Special Printer Options?--Are you going to print inside of forms? Do you need to print individual letterheads?

* Does The Printer Require Special Software?--Are you going to print color? Do you have to change fonts?

* Buying More Than One Printer--Will you be better off buying two printers or a multipurpose machine?

* Buying Used Printers--Can you save money by buying a used machine or will it cost more in the long run?

Though some of these subjects will be brief and others will require lengthier discussions, all are important in helping you analyze your needs. Concluding the discussion will be a selection guide to help you determine the best type of printer for your application.

Print Quality

Print quality is the first of the three most important considerations in selecting a printer. Print speed and duty cycle are the other two. For many users an absolute requirement for high quality printing supersedes all the other considerations. The printing may be needed as the master for offset printing reproduction, for legal documents or for business correspondence. Typeset quality, the highest level of print quality, is equal to the typography produced by typesetting equipment. The next level, letter quality, sometimes called correspondence quality, is equal to the printing produced by an IBM Selectric Typewrter. Near letter quality (NLQ), the third level, produced by a dense dot matrix printer is almost as good as letter quality, but upon very close examination you can see the characters were printed by dot matrix and not by solid type. With no standard developed to define near letter quality the range of appearances is wide from that which you absolutely cannot tell was done by dot matrix equipment to others just a little denser than ordinary dot matrix printing. In the past NLQ printing has been unacceptable to many businesses. The lack of acceptance of NLQ printing is largely a social convention dictated by the refusal to accept computer output on an equal basis with typing done on a typewriter. As computer printing quality improves these objections seem to be declining.

Draft quality, the lowest level usually produced by dot matrix printers running at normal speeds or by solid type line printers running at very high speeds, is completely legible but the spaces between dots can be seen. Draft quality is becoming acceptable for many reports generated by computer.

Laser Printers. Laser/xerographic printers produce the best looking printing. The quality produced is equal to that produced by high quality copy machines and is often equal to offset printing. Though just starting to appear in the business market, the technology has been developed for several years. Up until 1984 the prices were so high only service bureaus with high volume printing requirements could afford them. Laser printers, available now for as low as $3,495, will print complete pages of text or graphics at the rate of 12 pages per minute. Most laser printers use a xerographic engine unit made by one of the manufacturers of xerographic copiers. The xerographic engine features a replacable cartridge containing the print drum and toner. Because of their quality, speed and cost effectiveness, Laser printers will make large

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Randy's Ravings

by Randy Holcomb

Now that another year has come and past it's time to see what has happened in the TI World and see what lies ahead.

TI as a whole didn't fare so well in the last quarter reported taking a good-sized loss. However they have made some really powerful inroads into the field of Artificial Intelligence. New custom hardware and software, gives them an edge in a field that is beginning to blossom. The release of the Business Pro micro has been well received, despite its relatively high price tag, and rumors of a Unix machine from TI still keep buzzing here and there. It will be worth watching to see what TI has in store for its users this coming year.

Other TI-related events that happened this year includes the launch of the TI Information Network on Delphi, the revamped Texnet on the Source, and the continued success of the TI Forum on CompuServe. All three services are striving to provide a haven for TI 99/4A users. With more competition for the network dollar heating up we'll probably see maybe one or two new TI-related services spring up on the new networks.

Freeware software for both the Pro and the /4A was a very hot number this year, with terminal emulators (FASTTERM for the /4A, TERM for the Pro, amongst others), utilities and games being the biggest hits. Unfortunately, many of the freeware offerings have not been a monetary success for the authors of such programs, so PLEASE-if you USE the program, SEND the author a contribution!

The mythical 99/8 or its equivalent may be just around the corner. At the recent TI-Faire in Chicago (which I could not attend, unfortunately) there was a report that Myarc showed a non-functioning prototype of their IBM/TI compatible upgrade. At the time of this writing details are scarce but keep an eye out for an update. Also reported to be present at the show was Craig Miller of Miller's Graphics with the GRAM KRACKER, a GRAM emulator, which is scheduled for a 10/86 release date. If any of our readers attended the TI-Fair in Chicago why not write an article and send it in!

The Future

Right now its difficult to say what is going to happen because of the recent introductions of the new Atari STs and the Amigas, and the present lack of increased computing power for the 99/4A users. The Pro users have the Business Pro and should see many more IBM programs converted over to the TI. Loyalists and those who can't find anything better than their TIs will stand by their choice, and so will we.

Last month I promised the complete register breakdown of the 9938, but that will have to wait until next month while I try to come up with a more coherent layout that will be easy to understand. Also, for those of you who have asked for the Myarc RS232 fix but have not yet gotten a reply-my apologies for the delay, you should have them in your hand by the time you see this article. And as I have stated before, if you want a quick question answered, drop me Mail on Delphi to username RANDYH and I'll get back to you as soon as I receive it.

Speaking of Miller's Graphics, his latest release, Night Mission is now available, and it comes as both a cassette and a book, with the book explaining in very good detail how the program itself is structured, written and explains some of the CALL LOADs in Extended Basic that are used in Night Mission. If you wanted to know how a game program is constructed this is a great example of one method of doing so, and is easily understood by someone with some familiarity with Extended Basic. As soon as I can get my cassette cable back I can review the game and report back to you on its playability.

Call for Articles

Most of our readers are the kind of folk who like to share information and report on a good bargain when they see one. This is YOUR opportunity to do so with the rest of the TI community on a nationwide basis! If you have anything on TI computers send it in! Found a novel use of your system? Let others know about it!

This is all that I have for now. Rejoice in the holidays and we'll be back with more news and useful information in the TI world. ●

Printer Switches — Make Or Buy?

by Fred Blechman

If, like many computerists these days, you've added a second printer to your computer system, this article will tell you how to make a selector switch box to address either printer without moving cables. You'll also learn about some relatively inexpensive commercial ready-made units.

Why A Second Printer?

Now that letter-quality printers have come down in price, it may be time for you to consider adding a letter-quality printer for those "special" jobs that are not appropriate for your dot-matrix printer. Or, you may be faced with just the opposite situation: you have a letter-quality printer but you'd like to add a dot-matrix printer for the non-critical jobs, since it is faster and more versatile than most letter-quality printers--and probably also quieter.

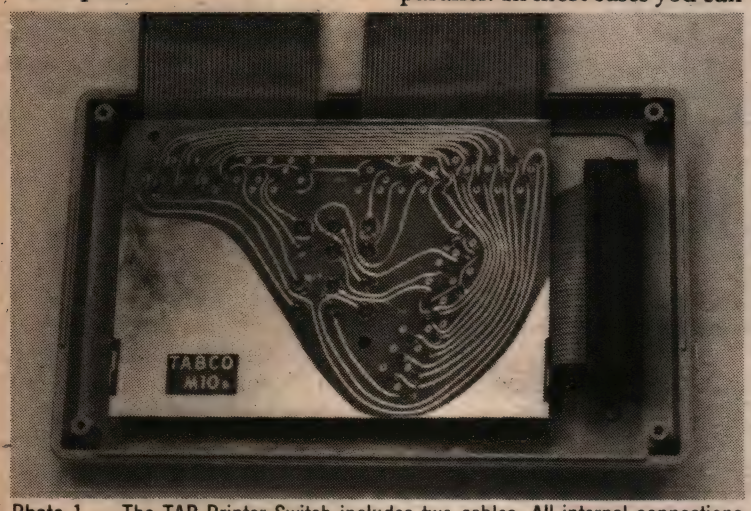


Photo 1 — The TAB Printer Switch includes two cables. All internal connections are soldered, not crimped.

For whatever the reason, if you have two printers it is usually necessary to disconnect your printer cable from one printer and connect it to the other when you want to change printers. This is annoying, and leads to wear-and-tear on the connectors. If both printers have the same type of interface (both serial or both parallel), a printer switch box is useful. You simply flick a switch to select printer A or B.

Serial or Parallel?

If one printer uses the standard RS-232C "serial" interface and the other uses the common Centronics standard "parallel" interface, you can direct your printout to either the serial or the parallel "port" (connector) with the appropriate "printer driver" in software.

However, I'm assuming both your printers have the same interface--either serial or parallel. In most cases you can tell by looking at the printer input connector. A DB-25 trapezoidal-shaped connector (25 pin sockets) is the most common RS-232 serial input. A 36-pin female trapezoidal-shaped connector is the standard for parallel. The connector at the computer end of the printer cable, unfortunately, does not have to be the same, and frequently is not. For example, the parallel output port of an IBM PC uses the typical DB-25 serial connector! So much for standardization.

How Many Lines To Switch?

At first thought, it seems that it would be a huge task to switch 25 lines at one time for a serial selector, and 36 lines for parallel. However, many wires are not used, and some are common grounds. Surprisingly, in the case of a serial selector switch, you can usually get by with switching only eight lines. Even more surprisingly, a parallel selector usually needs only four wires switched!

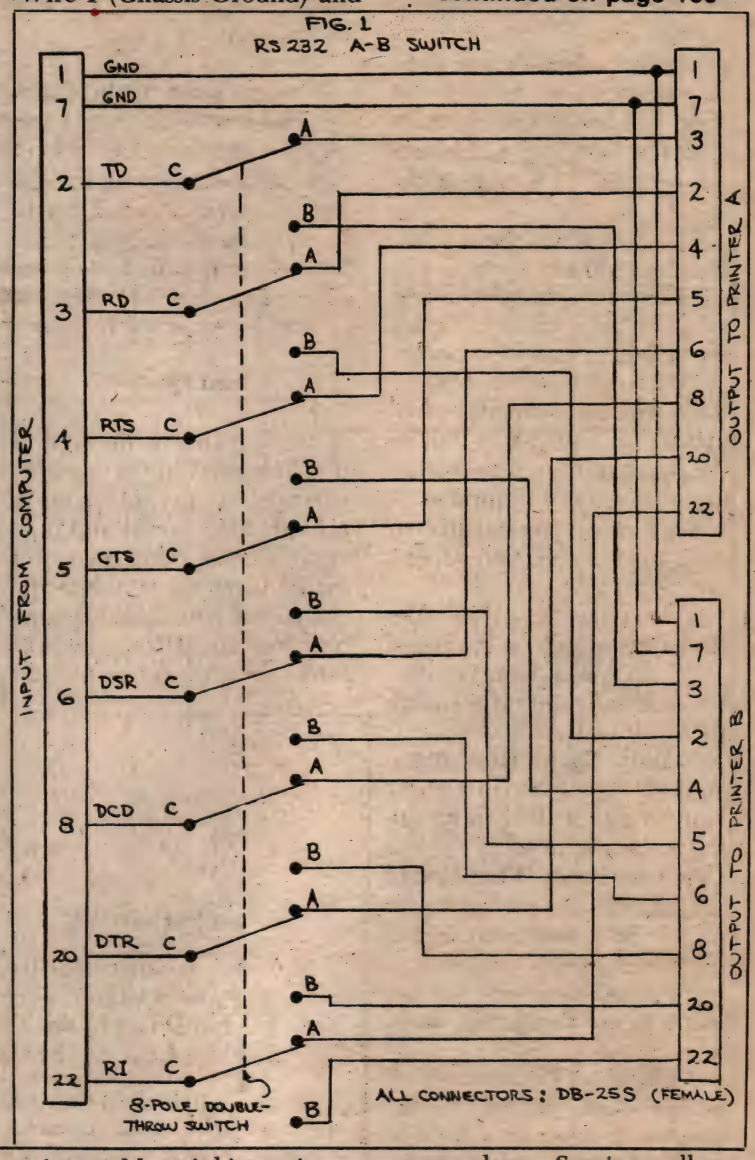
But beware of the word "usually" in the last paragraph. Printer interfacing, especially serial interfacing, is weird enough at times to drive a grown man to tears. Parallel interfacing (which is becoming the most common) is generally trouble-free.

If you don't have any special interfacing requirements, Figures 1 and 2 are schematics of serial and parallel selector switches. You can build either of these in a plastic or metal box, using standard connectors and switches--although you may have some difficulty locating the appropriate switches. More on that a bit further on.

Serial Switchbox

Looking at Figure 1, you'll see that only wires 2, 3, 4, 5, 6, 8, 20 and 22 are switched. Wire 1 (Chassis Ground) and Wire 7 (Signal Ground) are both directly wired. Notice in particular that the "TD Transmit Data" wire at the computer end (Pin 2) goes to Pin 3 of the printer, and that the "RD Receive Data" wire of the computer (Pin 3) goes to Pin 2 of the printer. Overlook-

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Buy a Printer

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inroads into the daisy wheel printer market.

Daisy Wheel Printers. For the present, the daisy wheel, solid-type printer is the logical choice for letter quality computer printing. Producing printing equivalent to the IBM Selectric Typewriter but being much faster and more reliable, printers and typewriters using daisy wheels have replaced the IBM Selectric as the standard of excellence. Daisy wheel printers are now available from less than $500 to $4,000 (depending on the speed and features selected).

Dot Matrix Printers. Most of the dot matrix printers for sale today offer "near letter quality" (NLQ) printing. Done by increasing the number of dots in the matrix or by overprinting, the results are truly very close to the quality produced by daisy wheel printers yet the dot matrixes print much faster. Typically, a good quality dot matrix printer producing draft quality printing at 180 characters per second (CPS) can now also print NLQ printing at 80 CPS. The results can be recognized as dot matrix printing but only upon close examination.

Many applications require high quality printing but many more do not. It is foolish to pay increased costs for quality you do not need. Dot matrix printers are perfectly satisfactory for printing much of the work in the office. There is not much computer printout done in the home, school or lab that cannot use today's dot matrix printers.

Chain Printers. The print quality of chain printers depends upon the speed of operation. Running at slow speed the chain printer can produce letter-quality printing if the type on the chain is kept clean and a single-pass carbon ribbon is used. Since the chain printer is mainly used at very high speeds to print large runs of mailing labels or bills, print quality is usually not an objective. Fabric ribbons are used to keep costs down and the results are legible but far from letter quality. The main drawback to using chain printers with personal computers is their expense. Yet, having been designed as part of mainframe or large mincomputer systems, using them with networks of powerful microcomputers distributes their cost more evenly and may even lower it to the point of being a cost effective alternative for your applications.

Inkjet Printers. The inkjet printer with its exceptional ability to blend colors offers excellent quality printing for graphics while the quality of text printing is as good as a near-letter quality dot matrix printer. Most inkjet printers work best with a special paper that helps the ink spray dry quickly. If you print a lot of graphics or if the printer must be operated in an environment where quiet is important then inkjet printers may be the correct choice.

Non-Impact Thermal Printers. If your main use of a printer is production of program listings or if you merely need "hard copy" of what is on the CRT, then one of the low cost, non-impact, thermal or electro-chemical printers may be just what you need. Operating at speeds of about 80 CPS to 120 CPS, text, graphics and anything else you can show on the screen can be reproduced. Though not bad for a low priced printer, remember special paper, usually only available in rolls is needed. This special paper has a coating and is somewhat objectionable to many people for business correspondence. Serving well as a copying machine master, coated paper is often used in this way principally to produce reference copies of graphic screen displays.

Print Speed

Very few people take the time to calculate the printing requirements of their work and as a result are often disappointed with the results of the entire computer system. Here are simple calculations to help you estimate your requirements.

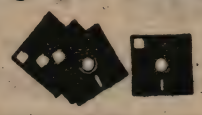
The average 8" by 11" sheet of paper used for business correspondence and text manuscripts can hold 80 characters per line of the 10 point type most often used on typewriters and computer printers. (In computer printing the spaces count as a character.) Nobody types from paper-edge to

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SPECTACULAR SAVINGS!

SUBJECT TO STOCK ON HAND

Magnetic Media



5¼" DISKETTES (Box 10)

WABASH	SS/SD w/Library Box	8.95
	SS/DD w/Library Box	10.95
BASF	SS/DD	13.90
MAXELL	SS/DD w/Library Box	13.95
	DS/DD w/Library Box	18.95
	DS/QD	33.60
	DS/HD	49.00
FUJI	SS/DD	15.95
3M	SS/DD	19.50
	DS/DD	25.50
	DS/QD	36.50
	DS/HD	42.50
DYSAN	SS/SD, 10 or 16 sector	14.95

5¼" SPECIAL (Case 100)

WABASH	SS/SD	80.00
	SS/DD	95.00
BASF	SS/DD	135.00

3½" DISKETTES (Box 5)

MAXELL	SS/HD	12.25
	DS/HD	18.25
3M	SS/HD	14.95
	DS/HD	19.95

Key
SS: Single Side
DS: Double Side
SD: Single Density
DD: Double Density
QD: Quad Density
HD: High Density

Media Storage

DISKETTE LOOSELEAF FILE PAGES
Non-glare, anti-static vinyl pages for storage of diskettes in 3-ring binders.

VINYL PAGES FOR DISKETTES

MVP-52	For two 5¼" diskettes	~~.95~~	.45
FDD1	For one 8" diskette	~~1.00~~	.35

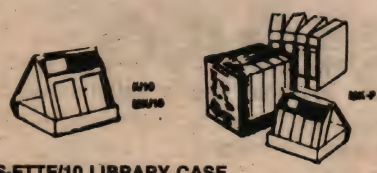


SAFEKEEPER ALBUM DISKETTE FILE
Store twenty 8" or forty 5¼" diskettes and index cards in 8½ x 11" vinyl pages (not included) in this 3-ring binder made of one-piece injection molded polypropylene. Latches close and lock with precision fit and "living" hinge is warranted not to malfunction for 10 years under normal use. Colors: Blue, Black, Beige

SK200	Safekeeper Album Diskette File	~~12.75~~	8.95

PC WALLET
Here's a lot of storage at an economical price. Your mini-diskettes are kept dust-free and flat in a strong 55 point "POLYFAST" plastic binder. Store 10 mini diskettes in its five anti-static formula pages. Close the Wallet and it tucks away in a minimum of storage space. Full title information can be quickly seen on each diskette. Specify color: red, yellow, blue, white or assorted.

PC MDW10	PC Mini Diskette Wallet	~~5.95~~	4.95



KAS-ETTE/10 LIBRARY CASE
Designed for storage and handling ten 5¼" or ten 8" diskettes. Cases are highly stable, will not tip over when in use and 100 diskettes can be stored on less than 19" of shelf space. Each case contains a spine label. Available in biege, black, blue, gray or red.

MK/10	Mini-Kas-ette/10 Library Case 5¼"	~~3.95~~	1.99

MINI-DISK COLOR CODER 5/PAK
The Color Coder "Colorburst" Mini Disk 5/Pak contains five Mini K/10 Library cases, one each in red, yellow, blue, green and gray, with five spine labels and fifty color coded diskette ID labels. Total 50 diskette capacity.

MK-P	Color Coder 5¼" 5/Pak	~~19.95~~	8.97

Media Storage



PORTABLE VERSA-PAK FOR 5¼" DISKETTES
A rugged library case that holds up to five (5) 5¼" diskettes and travels in a briefcase, back pack or mailbag. Virtually indestructable, with classic textured book appearance, it has patented, flexible fan tabs, pop-up easel and a face label for diskette identification.

28-03	Versa-Pak Library Case, Champagne	~~2.95~~	1.79
28-04	Versa-Pak Library Case, Process Blue	~~2.95~~	1.79

DISKBANK MEDIA MATE FILING SYSTEM
Pearl gray styrene base and smoke see-through top. Five adjustable dividers separate and display up to 50 diskettes at 30° inclination for easy reading. Identification labels are included.

MM3	3½"Media Mate Diskbank	~~14.95~~	10.95
MM5	5¼"Media Mate Diskbank	~~15.95~~	11.95



PROFESSIONAL DISK PROTECTION TRAYS
Lockable, portable boxes made from anti-static ABS plastic, for protection of floppy and mini disks. V-shaped for easy disk retrieval, with dividers the same height as disks, eliminating need for guide cards. International standard size to fit most suspended frame systems.

Model No.		Disk Capacity		
M85	Disk Tray	85 - 5¼"	~~49.00~~	23.95
F90	Disk Tray	90 - 8"	~~59.00~~	28.95
F40	Disk Tray	40 - 8"	~~39.00~~	19.45

DISKADDY
A compact, convenient and protective carrier that automatically adjusts to the number of diskettes it contains. Up to 22 disks are held upright and flat in accordion-style, clear, anti-static, vinyl pockets, with index tabs for quick retrieval. Easily fits into a briefcase and can withstand high shock without damage. Can be stored on edge as a book, upright in a drawer or box, or flat on a shelf. Index tab on outer cover. Specify colors: Red, Blue or Brown.

No.		Size	Capacity		
506	Diskaddy	5¼"	6	~~5.99~~	3.95
512	Diskaddy	5¼	12	~~8.99~~	5.95
522	Diskaddy	5¼	22	~~11.99~~	7.95
806	Diskaddy	8"	6	~~11.99~~	5.95
812	Diskaddy	8	12	~~14.99~~	7.95
822	Diskaddy	8	22	~~21.99~~	9.95

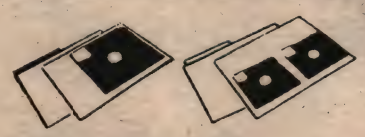


DISKETTE DESK FILES
Convenient desktop filing for thirty 8" or 5¼" diskettes, or one hundred Olivetti 2½" minidisks, within non-glare, anti-static vinyl files which provide full visibility of title information and come complete with colored labels for coding. Stand is charcoal black.

		lbs		
DF30	8" Diskette Desk File	4⅓	~~59.95~~	27.95
MDF30	5¼" Diskette Desk File	2⅔	~~39.95~~	21.95

FLIP FILES
Black suede vinyl binder protects and displays twenty 8" or 5¼" diskettes, within non-glare, anti-static vinyl files which display full title information and come complete with colored labels for coding.

DB20	8"	Flip File	3⅛	lb	~~42.95~~ 17.45
MDB20	5¼"	Flip File	2⅛	lb	~~36.95~~ 14.95



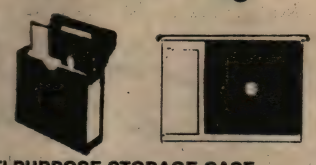
DISKETTE FILE FOLDER PAGES
Storage pages in white vinyl, with right and left tabs and clear, full back pockets for documentation. Adhesive labels included. 10 pages - 2 lbs.

FDF1	8" File Pages for 1 disk, 1 card (supplied)	~~1.99~~	.35
FDF2	5¼" File Pages for 2 mini disks, 2 cards (supplied)	~~1.99~~	.79

BLANK CARDBOARD BOXES
Plain, white cardboard boxes which will store 10 diskettes per box.

		List	Each
CB-8	Cardboard Box, 8"	~~.75~~	.45
CB-5	Cardboard Box, 5¼"	~~.70~~	.35

Media Storage



MULTI-PURPOSE STORAGE CASE
A sturdy vinyl case with top flap opening to hold up to 25 diskettes in folders. 1 case weighs 2 lbs. 10" x 12¾" x 4".

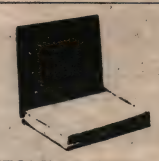
FDSC	Multi-Purpose Storage Case	~~16.95~~	11.75

HANGING FILE PAGES FOR 8" DISKS
Protect your flexible disks and file them on any standard suspension frame. Each page comes with a data card. 10 pages - 1 lb.

HFD	Hanger File Page	~~.85~~	.65

SUSPENSION FILES, LETTER SIZE
Non-glare, anti-static, file pockets hold and protect either one full-size or two mini diskettes, plus related 8½ x 11 documents, and either one or two index cards and movable tab. 10 pages - 1 lb.

DSF01	Suspension File - one 8" diskette	~~2.00~~	1.49



DATAFAST PRINTOUT BINDERS
Fastex Binders feature grained texture surfaces, rounded corners, 10" steel cable posts and steel rails to keep up to 8" of printout rigid and secured. Material is positively cinched by specially-notched file hooks allowing binders to hang in standard carts and racks. They are made of plastic-coated 20 point pressboard that resists moisture and general abuse up to ten times longer than ordinary pressboard. Sky Blue.

9511BB	For 9½" x 11" Unburst Printout, Sky Blue	~~4.25~~	3.39

Power Products



POWER SURGE CONTROLLER WITH RFI SUPPRESSOR
Multi protection for all electronic equipment and appliances. 6 ft. cord set type, 6 grounded heavy duty outlets, red and green self-monitoring indicator lights, on-off lighted control switch, press-to-reset circuit breaker automatically terminates any circuit overload. Almond color. 1½ lbs.

48735	Power Surge Controller	~~69.95~~	49.95

PANAMAX SURGE SUPPRESSORS
Trillionths of a second response time stops line disturbance from reaching damaging levels, with energy dissipation at the highest power handling level possible, to protect sensitive solid state equipment from transient voltage spikes and surges. Model SS120/1 has a single receptacle with standard three prong plug. Model SS120/4LCSN has four receptacles with illuminated master switch and 6ft. line cord with standard three prong plug, and provides noise (EMI-RFI) protection in common and transverse mode. Both models have external fuseholders and high grade ABS thermoplastic cases. Two year warranty on each.

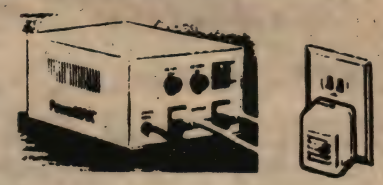
SS120/1	Surge Suppressor, 1 recp	~~59.95~~	29.95
SS120/4LCSN	Surge Suppressor, 4 recp	~~119.95~~	59.95



6-OUTLET POWER CENTER
Safely turns one outlet into six. Shock-safe, unbreakable, almond-colored housing for wall mount or portable use. 15 amp press-to-reset circuit breaker automatically terminates any circuit overload. 6 ft. grounded power supply cord. ON-OFF lighted switch. Safety caps block off unused outlets. 3" x 4" x 2".

48721-6	6-outlet Power Center	2 lbs.	~~24.95~~	10.75

Power Products



BACKUP POWER SUPPLY
This low cost, solid state unit, with maintenance-free rechargeable battery, protects sensitive electronic equipment from all common power failures, including surge suppression and brownout, and can provide 250 watts of instantaneous backup power for up to 15 minutes. When power is restored, the unit automatically switches back to AC operation. Audio alarm and power indicator lights. 6½ x 10 x 5". 16 lbs. One year warranty.

PowerMax	Backup Power Supply	~~559~~	279

ELECTRONIC POWER ALARM
Plugs into any 115 volt AC outlet for power failure detection. Alarm sounds continuously until reset button is pushed. Uses 9 volt alkaline battery (not included). Audible signal and blinking red light warns when battery power drops below 7½ volts. ½ lbs.

48830	Power Alarm	~~19.95~~	9.95

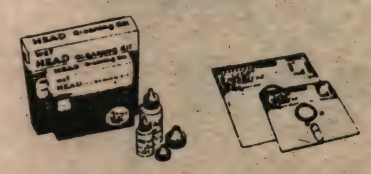
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Cleaners



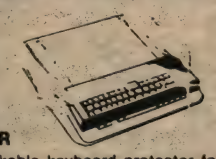
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H5W2	5¼" Wet, 2 Disks w/Solution (30 clngs)	~~22.95~~	15.95
H8W2	8" Wet, 2 Disks w/Solution (30 clngs)	~~24.95~~	15.95
H5W1-x	5¼" Wet, 1 Disk wo/Solution		4.25

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KV-300	CRT Visor	~~19.95~~	14.95



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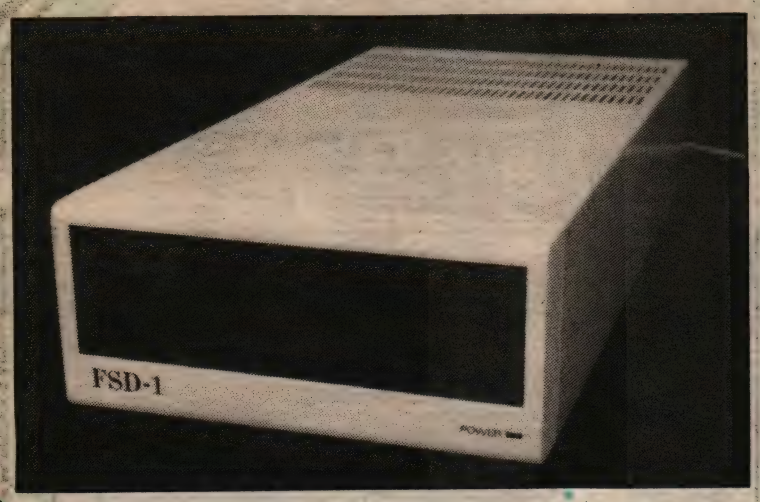
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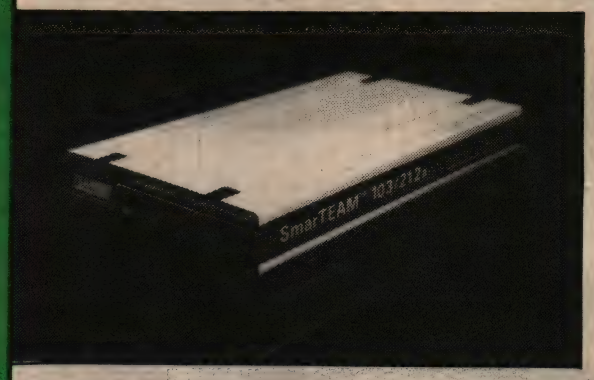
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7427	.25	74107	.20	74175	.80
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7430	.15	74116	.99	74193	.80
7432	.20	74121	.27	74195	.80
7433	.25	74123	.40	74199	1.00
7438	.22	74125	.40	74221	.60
7440	.19	74139	.35	74273	1.75
7442	.35	74145	.40	74365	.60
7445	.49	74148	.90	74366	.60
7447	.59	74151	.50	74367	.50
7451	.18	74153	.35	74390	1.40

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9.90000	1.25
10.69425	2.50
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11.088	1.59
12.000	2.00
13.440	1.00
14.31818	1.00
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16.00000	1.50
16.5888	1.49
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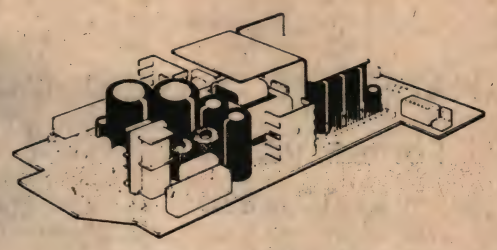
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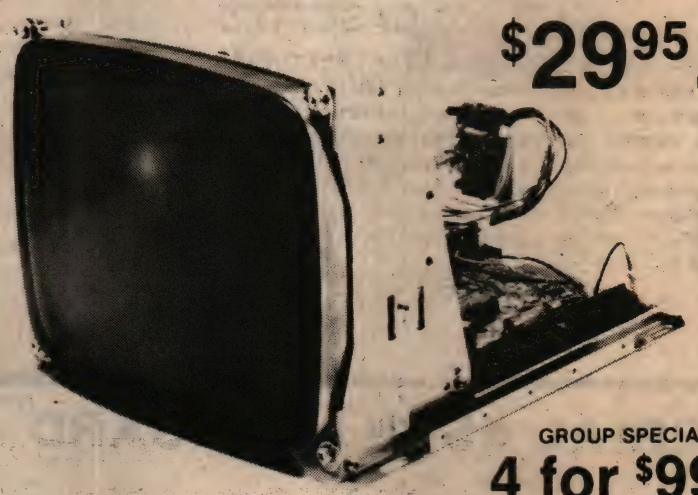
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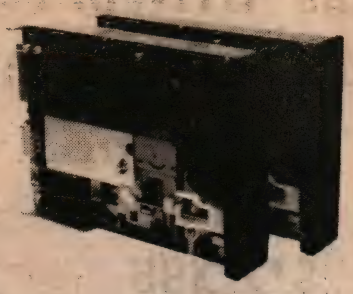
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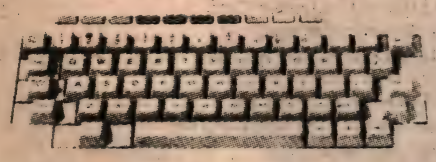
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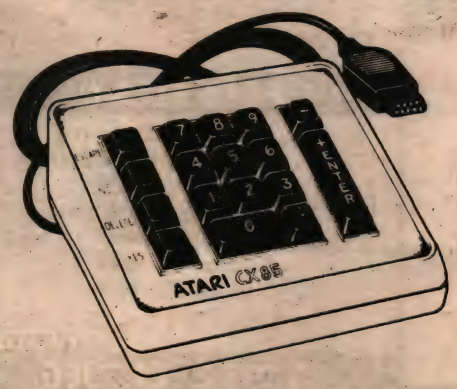
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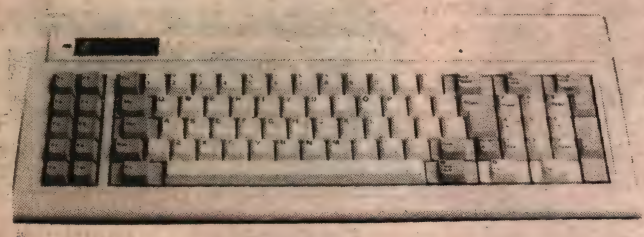
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MISCELLANEOUS

Life and Line Voltage

by Ralph Nottingham

Have you measured your line voltage? I have and I found it running from 122 to 123.5 volts. So what? Excessive line voltage shortens the life of your computer!

Many years ago, standard power line voltage was 110. Then it went to 112, 115, 117, 120 and now I have 122. When the power company raises line voltage, nothing works any better, many things wear out much faster and the power company makes more profit. If the state regulatory agencies were alert, informed, and sincerely interested in the welfare of the consumer, they would prohibit line voltages over 115 volts.

Many years ago, I had a new vacuum tube TV. Tubes started burning out. I checked the line voltage and it was almost 130! Fortunately I had a variable voltage transformer, so I set the TV voltage to 115 and my problems stopped.

I once had a friend, Lloyd Nelson, Ph.D., whom, I believed, was in charge of statistical analysis at G.E.'s Nela Park, Lamp Development Laboratory. Lloyd knew as much about lamp life as anyone. He had analyzed the data from life tests of millions of bulbs. He told me that three factors affected life, vibration, temperature and voltage and that the life of a lamp was inversely proportional to the 13th power of the applied voltage. Now I know of nothing else with that high an exponent. I had a business where reflector floods in the window burned continuously. They lasted about 30 days. I checked the line voltage, 122. The bulbs were 120 volt bulbs. I asked my friendly hardware dealer to order 130 volt bulbs. They lasted 8 to 12 months. Solve the following equation, $130^{13}/120^{13}$, or the ratio of 120 to the 13th power to 130 to the 13th power. My computer says the answer is 2.8. In other words a change from 120 to 130 volts makes almost three to one difference in life. My experience was even better. I have been told that the lamp companies make incandescent bulbs in 2 volt increments from 2 to 220 volts. At any rate, 130 volt bulbs are readily available. The lamp companies will tell you that you get the greatest luminous efficiency at rated voltage. However, you have many lamps where you care nothing about luminous efficiency, only life. Hall, porch, closet, and place that you just want light, put in 130's. They will burn slightly redder than a 120 but you probably can not tell the difference except by direct comparison. What does all this have to do with computers? You presumably have a monitor. It has a cathode ray tube. The cathode ray tube has a filament which is normally powered by unregulated AC, just like your light bulbs. The rest of your computer is getting regulated voltages, probably from a switching power supply, but the power supply has to dissipate excess power as heat. Now I am sure that heat is an enemy of semiconductor life. The colder you run your computer, within reason, the happier it will be and the longer it will live. I suspect that semiconductor deterioration is a chemical process. I have learned a rule of thumb in college that the speed of a chemical reaction doubles for each 12 deg.F. increase in temperature. So let's cool it.

What can you do about high line voltate? What I did, after having a chip fail, was this: I scrounged through my junk and found an old 6 bolt transformer. The transformer doesn't have to be very big, since it will only be handling a few volts, six, in my case. Suppose your computer draws 5 amps. It probably draws less. The dissipation is 5x6 or 30 watts. Even a doorbell transformer will do, if you can find one of the proper voltage. Measure your line voltage with a good voltmeter. If you don't have one, borrow one, but a digital multimeter is not very expensive and is very handy. Choose a voltage which will drop your line to 115 or below. Most computers are designed for 115 volts and will run on much less.

Not long ago, I evaluated a monitor, and I had to drop the line voltage to 85 volts before it failed to work properly, so 110-115 volts is probably fine. We are going to use the transformer as an auto-transformer. This has nothing to do with vehicles, but means we are going to connect the primary across the line and the secondary in series with one side of the line. The complete parts list is: 1 transformer, 1 metal box, 1 6 foot 3 wire cord, 1 duplex 3 pin outlet, 1 cord anchor, strain relief.

Mount the transformer in the box and drill or punch holes for the cord anchor and duplex outlet. If the trans-

continued on page 90

Expanding the Heath/Zenith 100/150 Series

by Ted Drude

Cheap Power - Turbo Chips for Your PC

If you have looked through any computer magazines in the past few months (including the *COMPUTER SHOPPER*), you've probably seen ads like this:

"Super-hyper Turbo Chip ....turns yer old lumbering PC into an AT for under $50!!!!

Good for whatever ails you... restores bad data... cleans disk drive heads ...works miracles ...just send your money to: Dr. Digits Miracle Chips, 8088 Silicon Drive, Nerd, CA

The "Turbo Chips" mentioned in ads like this invariably refers to the new NEC "V" series of microprocessors. Since their introduction last year, they have been touted as high performance replacements for Intel's 8088 and 8086.

Well, the ads may be exaggerating a little bit. The chips aren't quite the cure-all they are often hyped-up to be. They really don't turn your old H/Z-100 or 150 into an AT or Z-200-like machine for only $20 or $30. But, they do add some new capabilities to your machine that are hard to beat.

This article explains some of the advantages and limitations of NEC "V" chips. What they will and won't do is explained thoroughly. After reading this, you should be more aware of what the "V" chips are, how they work, and whether they're worth your money or not.

The "V" Series: What are They?

The NEC "V" series of CMOS CPUs are compatible replacements for Intel's 16 bit microprocessors. If the "V" series chips were just "clones" of the Intel parts, they wouldn't be all that interesting. But, the "V" series are more than just "form, fit and function" copies. They're hardware and software "supersets" of the 8088 and 8086, much like the Z-80 was a software "superset" of the 8080. The most important improvements of the "V" series over the Intel chips are:

1. Low Power CMOS Construction
2. Faster Effective Address Generation in Hardware
3. Expanded 16 bit Instruction Set (80186 compatible)
4. Faster Multiply and Divide Operations
5. Additional BCD Math Opcodes (for manipulating huge BCD numbers)
6. Faster Loop Execution in Hardware
7. 8080 Emulation in Hardware (The real kicker!)
8. 100% Pin and Software Compatible with 8088/8086

Currently, there are two "V" models in production: the "V-20," which is an 8088 replacement and the "V-30," an 8086 replacement. Slated for "near future" production are a high integration unit, the "V-40" (80186 compatible) and a "flagship" processor the "V-60" (80286/80386 compatible).

How Compatible Are They?

The hardware and software compatibility of the "V" chips is such that you can pull out virtually any 8088 CPU, stick in a V-20 (or switch a 8086 with a V-30) and run with no problems at all. NEC has done an excellent job of "reverse engineering" the Intel chips to be totally compatible. They've done such a good job that Intel has filed a suit to prevent NEC from shipping the chips over to the US. The issue is still in litigation at this time. (The latest news: NEC is claiming the 8086 microcode instruction set, used in both chips, should be in the public domain!)

The "V-series" moniker of the chips appears to be a marketing ploy (the "V" apparently stands for "victory"....over Intel, I guess). The actual NEC model numbers are uPD70108 (the 8/16 bit V-20) and uPD80116 (the 16 bit V-30). Both chips are available in 5 and 8 MHz versions, just like Intel's.

What Are The REAL Advantages of the "V" Series?

Hardware

Since the "V" series use CMOS circuitry, they draw much less current than the normal NMOS 8088/86. Something like one fourth to one tenth of the current. This helps keep your computers insides a little cooler. It also makes the "V" chips prime choices for use in battery powered machines. Since the "V" chips were designed to be as compatible as possible, most of the other hardware improvements are internal. Some new registers have been added to make hardware multiply and divide quicker, so that mainly affects the software. The new hardware address generator, though, does increase the "idling" performance of the chip about 10% over the standard Intel parts, at the same clock speeds.

(On an "unofficial" level, some technicians have done speed evaluations of the "V" chips and say that the 5 Mhz version are actually good to over 7 Mhz and the 8 Mhz versions will often run at 11 to 12 Mhz! Now, at 12 Mhz, the V-20 will be competitive with the 6 Mhz 80286 AT. Look for some cheap "Turbo Boards" to appear soon using souped-up V-20s.)

Software

Most of the real technical advances of the "V" series comes from its expanded software instruction set. As mentioned above, the normal 8086 multiply and divide instructions have been enhanced through the addition of three new dedicated registers on the chip. A new loop counter register lets loop instructions (e.g. REP and REPC) execute faster. The "V" chips not only include all the 8086 opcodes, but the expanded 80186 instruction set is also incor-

continued on page 90

New Racal-Vadic Modem For 1200 BPS Transmission

Racal-Vadic has introduced the 1200PA, a 212A compatible modem that solves many application problems encountered in dial-up modems today. Starting with basic features--212 and 103 compatibility, AT2 (Hayes) dialing, automatic answer and originate, and complete diagnostics--the 1200PA adds error control, network control, and security within one compact package.

The 1200PA includes Modem Manager, a unique Racal-Vadic facility for network control that enables a network manager to read and change options, phone numbers, logon messages, and security orders over telephone lines. The 1200PA also provides built-in MNP error control with enhancements for short comment and synchronous operation. A full dialing keyboard permits control, option setting, dialing and diagnostics from the front panel, eliminating pencil switches or dependence upon terminal protocols. An LCD display accompanies the keyboard for menu-style feedback and operator interface.

Users can store as many as 15 telephone numbers and logon mesages in the 1200PA's non-volatile memory for automatic dialing. Descriptions (e.g., "home number," 'factory #1 number') can also be stored. A number may be linked to an alternative number and the modem programmed to redial up to nine times before linking to the alternative. A security features allow users to automatically dial pre-stored numbers without knowing what they are or being able to change them.

The 1200PA supports both the Racal-Vadic and the extended AT command set used in (Hayes) 2400 bps modems. Thus, upward and downward compatibility with software communications packages and increased use flexibility is assured.

The 1200PA uses industry accepted MNP to eliminate errors. MNP is an automatic request for retransmission (ARQ) protocol that normally reduces asynchronous line speed because it requires overhead bits. To keep the data rate constant at 1200 bps, the 1200PA automatically switches to synchronous transmission when communicating with another modem using the same level MNP.

Automatic speed conversion and flow control allow the 1200PA to operate with virtually any data terminal interface and speed. For example, data from a 1200 bps computer port may be transmitted to a terminal operating at 300 bps, with the 1200PA performing the necessary speed conversion; the modem, in effect, acts as a buffer. When the buffer is full, the modem sends a character to the port that holds further transmission until it is clear.

The single-unit price of the 1200PA is $495, and it is available from stock in now.

For additional information contact Racal-Vadic, 1525 McCarthy Blvd. Milpitas, CA 95035, (408) 946-2227.

Mention that you read about it in the *COMPUTER SHOPPER*. ●

Life And Line
continued from page 89

former is not too big, you can use a standard 4x4 inch electrical utility box, with perhaps an extension which will make it 1½ inches deeper and a metal cover which comes punched for a duplex outlet. Plastic cord anchors are now available which snap into a knockout hole, so little drilling is required. Connect the center, or ground wire of the cord, to the ground on the duplex outlet, or to a lug bolted to the box. Connect the other two wires to the transformer primary. Temporarily connect one side of the line to one terminal of the low voltage secondary. Measure the voltage from the other side of the line to the other terminal of the secondary. The line voltage will either be increased or decreased by the amount of the secondary voltage. If it is increased, connect the line connection to the other side of the secondary. You should now read the line voltage minus the secondary voltage. Connect this secondary terminal to one side of the duplex outlet, and the other side of the AC line to the other terminal. There you are, a "Bucking Box." I plugged a six receptacle outlet, available at all hardware stores, so I now have six reduced voltage outlets. When I was in school, I designed and built Radio Studios for the university. I wired them so that all circuits, even receptacles, except the clock circuit, went through one box. When we went home at night, we plugged the "big switch" and didn't have to worry about the possibility of leaving a soldering iron plugged in. I applied the same philosophy to my computer. I have an isolator which has three outlets. I mounted a dual receptacle box under the front edge of the computer desk. I put a toggle switch in one hole and a red pilot light in the other. I didn't want some visiting child to activate the switch when I was working, so I got an exterior cover plate which has two spring loaded flaps over the holes. I drilled out the rivets and removed the cover from the pilot light, but left it over the switch. Now I have to raise the cover to flip the switch. My computer, monitor and printer are all on this circuit, so when the pilot light is off, my system is all off. The isolator is wired through this switch to my bucking box.

I once heard of an electrician who got a 200 ampere 6 volt transformer, and connected it between his meter and his switch box, so that the voltage all over his house was reduced 6 volts. Such transformers are neither common or cheap, but it is a good idea. My computer represents a major investment for me, I am fond of it and I want to treat it kindly. Surely the least I can do is give it the voltage that it was designed to work with. ●

Expanding Heath/Zenith
continued from page 89

porated into the "V" chips.

There are several new instructions added that are unique to the "V." Some of them are BCD math operations that allow you to add or subtract a BCD number that is anywhere from 1 to 256 digits long! Now that's some kind of precision! Remember, this is all in hardware, not software. Others handle the 8 to 16 bit-emulation modes.

When running a "V" chip in a typical H/Z 100 or 150 with Z-DOS or MS-DOS, and using the normal 8088/8086 software, the performance increases and you really won't notice a lot of difference. Some ads are claiming 40 to 90% improvement by just plugging the "V" in. Well, you can realistically expect about an average of 10% improvement. The improvement gets bigger when you spend a lot of time running loops and multiplying or dividing.

In order to take advantage of most of the performance improvements in the "V" series, however, you have to run software written to take advantage of its features. When running code that is optimized for the "V," the chips do exhibit outstanding performance. NEC has benchmarked them and states that their performance is "on par" with the 80286. Supposedly, there are some software houses (like Borland, among others), recoding some of their old 8086 program to take advantage of the "V" instruction set. We may see a version of Turbo pascal that is coded to take full advantage of the "V."

Some Benchmarks

In order to find a more objective basis for evaluating the "V" chips, it is necessary to run some test programs. Wolff Computers and Electronics graciously provided us with an 8 Mhz V-20 for evaluation purposes. (They stock both the 5 and 8 Mhz versions.)

To compare the effect of running 8086 software on the two chips, an additional factor of increased clock speed was also introduced. Several benchmark programs were run on a Z-150 PC while using both an 8088 and a V-20 at 4.77 Mhz and at 6.66 Mhz. (To gain the higher clock speed, a Consumer Products Development (CPD) "Time Works" speed-up module was added to the Z-150. A more thorough review of this product will be made in a future column.)

Table #1 shows the results. There are four general benchmarks used. The first test involved loading and compiling the "Sieve of Erasthosenes" Prime number program (as published in **BYTE**) in Turbo Pascal (V.2). The second test involved actually running the Primes program. The third test loaded and compiled the 1275 line "MicroCalc" program of Turbo Pascal to disk. The fourth test measured the time required to boot Microsoft Work (V.1.1) from a floppy disk. These four tests involved many different operations including math, data movement, and I/O. They should be representative of a lot of typical computing a CPU will have to handle.

Unfortunately, none of the benchmark tests demonstrate the speed advantages of using the enhanced "V" instruction set over the 8086 set. At this point, we'll have to take NEC's word for it that there is a significant advantage. Apparently enough software manufacturers are convinced that they're modifying their software just for the "V" chip set.

Table # 1

	Load/Compile 'Primes'	Run 'Primes'	Load/Compile 'Calc'	Boot 'Word'
8088 - 4.77 Mhz	01:70	15.87	30:75	23:97
V-20 - 4.77 Mhz	01:30	15:01	26:73	23:61
8088 - 6.66 Mhz	00:97	11:44	23:87	19:50
V-20 - 6.66 Mhz	00:84	10:74	22:24	19:42

Comparison between 8088 and NEC "V-20"

(All Time in 'Sec.:Hundr.' format.)

Summary

As Table #1 makes clear, the "V" chips are not significantly faster than standard Intel parts:

1) At the same clock speed.

2) When running unenhanced 8086 software.

But, when running software optimized for their expanded instruction set, or at a higher clock speeds, their advantages are significant. One of the most important features of the "V" chips are their 8080 hardware emulation. But that topic is so lenghty, it is best to make it a separate article. So, next month, we will look closely at the 8080 capabilities of the "V" series. In the next couple of months, we'll also look at increasing the clock speed of your H/Z-150 (our original topic), and the MS-DOS to CP/M emulation software that runs on the "V."

Errata and Corrections

I want to clear up some errors from a previous column. A couple of issues ago, when we discussed expanding the H/Z-150 to a hard disk. Speaking from "second hand" information, I said that you couldn't add a full-sized Winchester drive to a 150. Even though there's plenty of power for one, I didn't think there was room on the disk drive chassis.

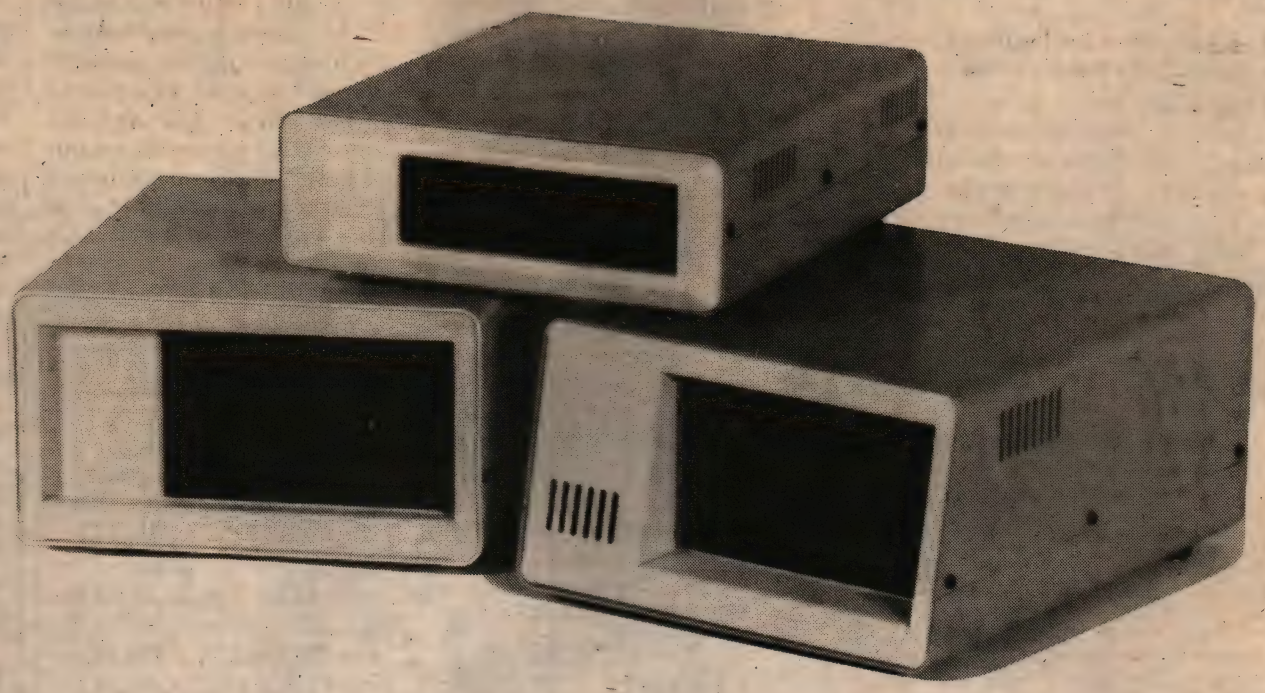
Well, I was wrong. You most certainly can add a full-sized drive as long as there is just one half-height floppy drive in the machine. I took my 150 apart and found there was really only enough room for one full-sized or one half-sized hard disk down below the top disk drive. I suppose you could put two half-height floppies and a half-height Winchester in there to be a very tight squeeze to make it all fit!

I've seen ads for dealers who advertise that they can put two floppies and a Winchester in the same 150. Well, they must be using an awfully small Winchester, perhaps one of the 3.5 inch drives. Anyway, there is room for a full-sized drive. That makes it possible to add one of the huge (150 Megabyte) drives that are available for the Z-200 or AT....hmmmm...I want one!

Products Mentioned:

Wolff Computers & Electronics, 901 E. Plano Pkwy. #117, Plano, TX 75074, (214) 423-8095, (NEC V-20 & V-30 chips), Consumer Product Development, 6242B Rumford Lane, Houston, TX 77084, (Time works speed-up module for H/Z-150 $34.95 plus shipping). ●

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If you are searching for disk or tape packaging alternatives, consider the Microware product line:

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The Cipher model 5210 Floppy Tape Backup System is a low-cost file-oriented backup system employing the 3M DC600A ¼ inch tape cartridge media. It connects to the IBM-PC and - XT systems using the external floppy disk interface connector. It is addressed as the last two floppy disks under PC-DOS 2.0 or 2.1.

The floppy tape system is capable of backing up two IBM 10MB hard disks (or one 20MB hard disk) on a single cartridge. Larger disks may be backed up on multiple cartridges.

The 5210 adds three new commands to PC-DOS: FTBACKUP, FTRESTOR and FTFORMAT. These commands are functionally compatible to the existing BACKUP, RESTORE and FORMAT commands and use the same syntax.

SYSTEM FEATURES INCLUDE:

- 25MB (formatted) capacity in a single cartridge
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Dealer, Distributor and OEM inquiries are welcome.

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Super Crunch continued from page 64

Feature Comparison
Super Crunch™ Vs. Excel

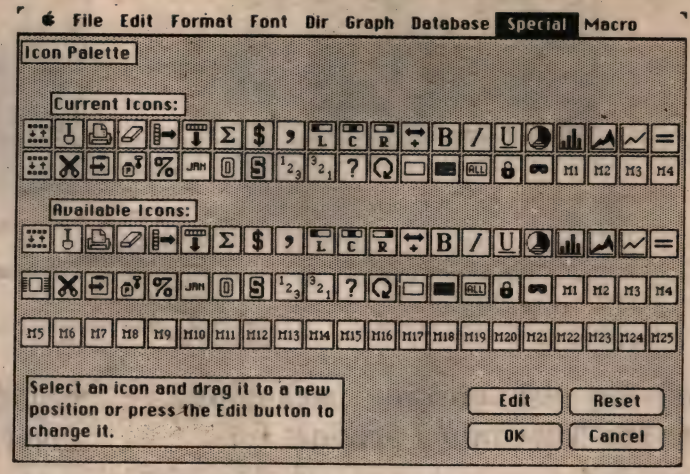
	Super Crunch™	EXCEL	Jazz™	1-2-3™
Special power features				
Number of Icons (always available)	42+	0	0	0
3-Dimensional Worksheet	Y	N	N	N
Speech Output (Talking)	Y	N	N	N
Enter data anywhere (not using memory for empty cells)	Y	N	Y	N
Auto Calendar/sequence months	Y	N	N	N
Auto Closing of open parens	Y	N	N	N
Design own Icon for a macro	Y	N	N	N
Table Generation	Y	Y	N	N
Performance				
Selective/Smart Recalc (TURBO)	Y	Y	N	N
# of Cells in 512K	10-15K	unknown	11K	<13K
Number of keystrokes	63 50% fewer	140	n/a	n/a
Special database features				
Cross tabbing	Y	N	N	N
Forms Design	Y	N	Y	N
Character styles				
Change style by cell	bold/*italic* underline/ shadow/outline	bold/*italic*	N	N
# of defined functions	120+	86	99	51
Macros				
User definable functions	Y	Y	N	Y
Programmable/recorder	Y	Y	N	N
Design own Icon for a macro	Y	N	N	N
Auto run on Startup/Exit	Y	N	N	Y
Auditing worksheet (Error Prevention/Correction)				
Audit formulas	Y	N	N	N
Audit cell references	Y	N	N	N
Audit cell dependencies	Y	N	N	N
Print References/Dependencies	Y	N	N	N
Cell Notes	Y	N	N	N
Worksheet Notes	Y	Y	N	N
Check entries (Speech Output)	Y	N	N	N
Graphing				
Types of graphs	5	6+	6+	4
# of steps for graph	2	4 6 steps for others	6	45

Super Crunch is also 250 levels deep. In other words, Super Crunch offers the user a stack of 250 blank worksheets and the user can then fill information down through different levels of the stack.

For instance, a user might have five salespeople and need to create a monthly sales report for each person as well as report of the group's total sales per month. With 3-D, the user could create the format for a sales report on level one, and then copy the form down through level six to avoid tedious retyping of the same form. Then the user could use levels two to six for a separate report on each salesperson. Level one could then be used to create a summary report which would be automatically updated if the numbers changed in levels two to six.

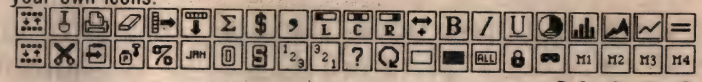
This unique 3-D approach will also enable users to explore "what-if" scenarios on different levels of the spreadsheet. The user will then be able to view each of these scenarios, or even print them on a printer.

continued on page 96



Super Crunch™

Super Crunch shows the Macintosh™ at it's best by turning 38 of the most common spreadsheet operations into point-and-click icons. Super Crunch also offers 25 icons which can be used with macros. You can choose which icons will appear on the active computer screen at all times. You can even design your own icons.



The Super Crunch™ Icon Bar

MacUniverse

continued from page 63

harm. The adventure is huge; it requires two disk to store all the information.

Before rushing out to buy this game, there are three caveats to be aware of. First the game is not totally debugged; I got caught in a loop that totally destroyed the graphic portion in the session I was playing. Second, the program is copy protected; not even the current version of Copy II Mac will copy it. Finally, the publisher will not replace a disk after the ninety day warranty has expired. After that period, if, for any reason, a disk is damaged or becomes otherwise unplayable, you have to buy a new copy. In your Universe Master's opinion this is a dumb policy for a program that allows you to save data to a disk. I have had too many disks die on me for this policy not to scare me.

SUPER CRUNCH: One of the problems in reviewing software is that by the time your Universe Master is comfortable enough with a program to write the review, the program undergoes major revisions. This just happened with Crunch by Paladin Software. Crunch is an integrated spreadsheet that combines extensive use of icons with some

continued on page 94

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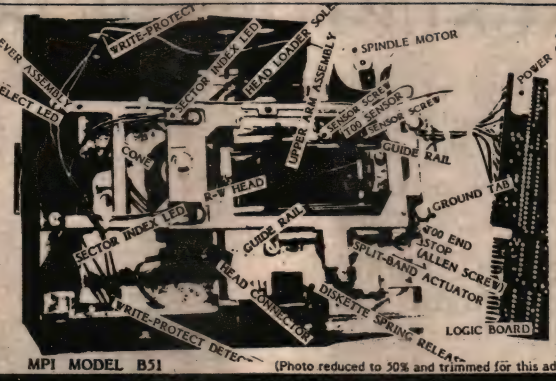
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MPI MODEL B51 (Photo reduced to 50% and trimmed for this ad)

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The July 31, 1985 JACK ANDERSON column, the Feb. 1985 OMNI ("THE MIND FIELDS"), etc. describe the type of device we developed as an extensive offshoot to our popular HEAL THYSELF research.

We discovered that, if you use certain electromagnetic configurations, waveforms and intensities, healing results. At other particular configurations, waveforms and intensities a powerful, invisible, silent and instantaneous research tool or weapon results!

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- COMPUTER PHREAKING — ☐
- PRINTER & PLOTTER MANUAL ☐

Riddle of Sphinx continued from page 14

minal can display a block of the host computer memory from any place to any place with any selected data byte, move memory between any two addresses, and several more memory associated tests including running a memory test in the target system RAM noting faulty chips.

Other ICE tests include examining data at any selected I/O port, outputing given data to any port, run loops to allow scope examination of particular areas, provide trace and untrace features, display all CPU registers and flags, and allow modification of any register.

A number of other commands allow enabling and disabling of breakpoints, printpoints, and interrupts from the target system, and allow for the display of the ICE status at all times.

The Nicolet ICE unit is also provided with an assembler/disassembler which allows for the running of machine-language programs.

Thus you can see that an ICE device not only acts as a substitute CPU, but also allows altering and manipulation of the target system RAM, control of system I/O operations, interrupts, control the disk system, and control of everything but the DC power source and the system clock.

It then becomes possible to run complete diagnostics on the faulty computer regardless of what is wrong with it, something that cannot be done with conventional diagnostics.

As powerful as this new approach is, there is one more application (and as of this disclosure, unknown) use of an ICE system that may change the complexion of computer service as we know it. In fact, some reader of this column can possibly make a big bunch of bucks by pondering on the following.

As I mentioned a few paragraphs back, the ICE system connects to an associated video terminal via an RS-232 connection.

What does an RS-232 connection mean? A video terminal — yes; a printer terminal — yes; but keep in mind that modems are also driven by RS-232 signals.

Now consider a faulty computer located in an area where computer stores just sell hardware and software, and have no repair facilities. (Or, imagine that the computer has an ICE device built in.)

All that has to be done is connect one lead of the ICE device to the faulty system CPU socket and the other (RS-232) lead of the ICE device via a modem to a phone line.

The technician then telephones the faulty computer manufacturers service department, which can be anywhere a telephone (or even a two-way radio link) is located, regardless of distance — even overseas.

The manufacturer's computer then controls the local ICE device to perform a full diagnostic on the faulty machine.

At the end of the testing, a printer connected in parallel with the RS-232 video terminal, then makes a hardcopy of the required chips (or boards) to change or make the faulty system work properly once again.

Since the diagnosis is purely software, such remote testing can take place at any time of the day or night, and the local computer store can "stack up" several faulty computers for diagnosis during the night when the computer store is normally closed.

Think about the possibilities.

Nicollet Digital Systems makes the Emulator 8 for 8088, NSC-800, Z80, Z80 Plus, 8085, 68000. They are priced from $490.

For additional information about the Emulator 8 contact Nicollet Digital Systems Division, 201 Fourier Avenue, Fremont, CA 94539; phone 1-800-NICOLET, in California 1-415-990-8300. ●



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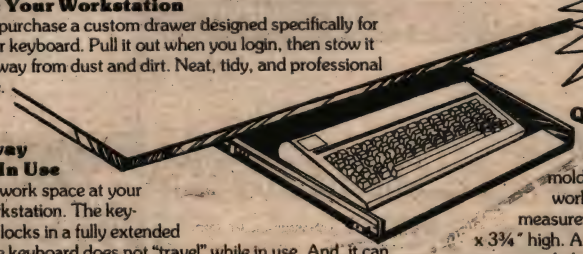
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Tandy Reviews
continued from page 60

Superdisk. With the combination of NEWDOS/80, Superdisk and Supermem you have a very powerful set-up. My RAM disk is almost 701K with a RAM of 768K. By putting the word processor, data base management or spreadsheet on the RAM disk along with the data file there is no wait for disk access. Since a lot of my work requires that the computer run all day the set up is negligible for the results I am able to obtain. The entire set up can be run as "DO" files making the process semi automatic.

Some programs require particular disk drive assignments and/or particular memory assignments in order to run. This presents a problem but Superdisk can be configured in so many different ways that most programs will run without a hitch on the RAM drive. A few programs do their own disk I/O and therefore will not recognize the RAM drive. Superutility is one of these. If a program uses all of the main memory and will not recognize HIMEM it will not work with Superdisk. There are not many of these programs.

If you are a NEWDOS/80 user Superdisk can be a great asset to you. The program is available for Models I, III and 4. It is supplied on diskette formatted in single density. With NEWDOS/80 that presents no problem. Just follow the directions. After you have used the RAM disk for a while you will wonder how you ever got along without it.

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MacInker

No, this isn't a refugee from the Macintosh section. The MacInker is a re-inker for your printer ribbons. Since the first day I bought a printer I have been told "Don't ever re-ink the ribbons, you will clog the print head." I finally had to try for economic reasons if no other. We use lots of ribbons and then they just gathered dust in a drawer in my lab. At current prices all those buried dead ribbons bothered me. I tried buying new ribbon packs and putting the ribbon in the cases. It works but it takes time and every so often you have a heck of a mess.

Computer Friends in Portland have had the MacInker on the market for some time. The older model was for a specific type of ribbon. I have three (MX 80, DMP 400 and DMP 2100) that I have used without a problem for two years. In that time I have not bought a new ribbon but I have reclaimed some that were "through" and re-inked them not once but countless times. In the two years I have thrown away two

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MacUniverse
continued from page 92

charting and database functions. The review was written and a call was made to the publisher to clear up a few minor points. I was told not to finish it as there was now Super Crunch. This program has extensive macros (which includes a full pascal language), a three dimensional spreadsheet (it can go back 250 levels with a one megabyte Mac), the ability to read back numbers and text, and extensive error checking. Super Crunch has a suggested list price of $295. Registered owners of Crunch will be able to upgrade to Super Crunch for free.

MACNIFTY SWITCH: Because Steven Jobs had his idea of what a computer should be, the Mac was designed with a closed architecture. All peripherals, other than a second disk drive, had to go through one of the two nine pin ports on the back of the Macintosh. This limitation made it a royal pain to try and use three peripherals. You constantly had to turn the Mac around and change the cables. Realizing there had to be a better way, the Kette Group designed the MacNifty switch. This switch allows two or four different peripherals to be attached at once. Merely turn the knob on the switch and a different peripheral is "attached" to the Mac. The MacNifty switch comes in two formats, an AB switch and an ABCD switch. The AB switch allows two peripherals to be attached and the ABCD allows four. Hooking up the MacNifty switch is very simple. It comes with either three (the AB switch at $34.95) or five (the ABCD at $54.95) cables. Take the cable with the male connector and attach it to the Mac. The other cables have female ends. Plug the peripheral into a cable and set the switch. That is all there is to it.

The only caveat with using a MacNifty switch is not to turn the switch with the power on. Some products must be connected when the Mac is powered up for them to work.

SWITCHER UPDATE: In previous columns I have discussed Switcher. This is a program from Apple that allows you to use up to four applications at one time by allocating portions of the Mac's memory. Then, once the applications are in memory, you can quickly switch between them and share information. However a common problem faced by people Using Switcher is deciding how much memory to allocate each application. What follows is a summary of memory sizes for Microsoft software:

Application	Preferred Size	Minimum Size
Excel	304K - 512K	256K
Word	160K	128K
File	288K	128K
Multiplan	160K	128K
Chart	192K	128K

Additionally Microsoft has found the following limitations with Switcher and its software:

1. WORD: Do not use the option-command-shift

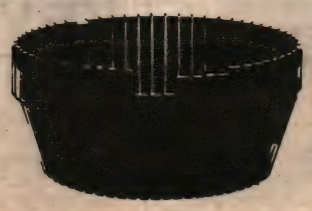
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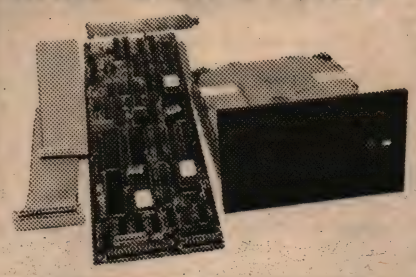
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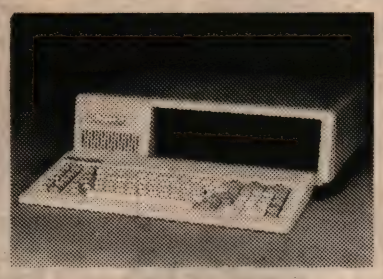
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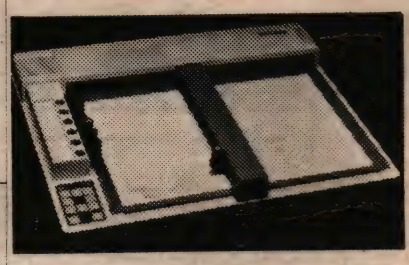
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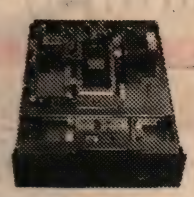
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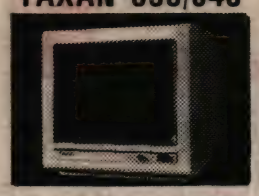
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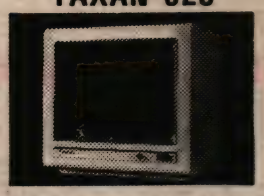
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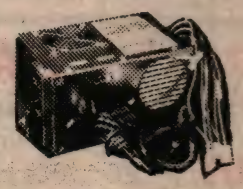
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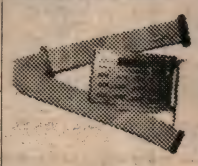
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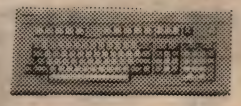
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Called "Plains & Simple"™, the package automates the general ledger, accounts receivable and accounts payable functions found in nearly five million businesses using manual one-write systems. The familiar one-write system is graphically reproduced on the Macintosh screen so one-write customers will instantly recognize the entry screens and "forms."

This familiarity, combined with special features used throughout Plains & Simple such as extensive on-line help, allow customers to convert their accounting from manual to automated with ease.

"We recognize that some of the resistance to purchasing software is due to the training and set up time required by the customer. Plains & Simple solves this by so closely emulating manual one-write systems that it allows the customer to transfer his or her accounting from pen to keyboard virtually overnight,"said Douglas Burgum, president of the four and one-half year old software company.

"Plains & Simple combines the proven set of a manual one-write system with the ease of use of the Apple Macintosh. The result is an accounting product that will be incredibly easy for customers to learn and use," Burgum said.

Guy Kawasaki, software products manager for Apple

continued on page 107

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Super Crunch continued from page 92

without ever changing the original spreadsheet numbers.

And Now A Word From Our Spreadsheet

One final feature which distinguishes Super Crunch for the competition, is Super Crunch's new "say it" feature. With "say it," users will never have to use two people for proofreading again, because Super Crunch will read both text and numbers aloud. The "say it" feature can also be used to alert a user when recalculation has been completed, to explain the function of a macro, or to verbally explain an error message.

Including "say it," Super Crunch will offer seven different auditing, or self-checking, features that are designed to help users detect, and prevent costly spreadsheet errors. Crunch and Super Crunch are the only Macintosh spreadsheet packages to incorporate built-in auditing features.

Pricing Strategy

When Super Crunch ships at a suggested retail price of $295, the price of Crunch will be lowered from $295 to $149, and registered owners of Crunch will be entitled to receive Super Crunch free of charge. With this offer, Paladin is making good on its earlier promise to make a free macro upgrade available to all registered owners of Crunch. In addition, Paladin's pricing strategy ensures that existing Crunch customers have the option of upgrading to Super Crunch, easily, and at no additional cost.

For further information contact Paladin Software Corp, 3255 Scott Blvd., 7C, Santa Clara, CA 95054

Mention that you read about it in *Computer Shopper*. ●

COMPUTER ASSEMBLY MANUALS
by Raymond Kosmic

"BIG BLUE SEED" for IBM™ BUILDERS
"APPLE SEED" for APPLE™ BUILDERS

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Epson FX-80 – 80 col., 160 cps . Call
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Tractor for LX-80 printer $25
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P351, 240cps, 136 Col., 24-pin head, plug-in font cartridge,Para. $1,125
P1340, 192cps, 80 Col., 24-pin . $565
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CITIZEN

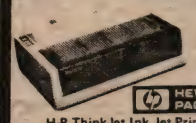
MSP-10 – 80 column. $345
MSP-15 – 132 column $495
MSP-20 – 80 column. $485
MSP-25 – 132 column $675

STAR GEMINI

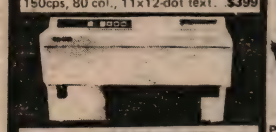
SB-10, 24-pin, 80 column . . . . .Call
SG-10/15, SD-10/15, SR-10/15 . . Call

DIABLO

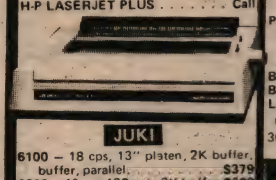
Diablo 630 API, 40 cps daisywheel printer . . . . . *Sale Price* $1,395



H-P ThinkJet Ink Jet Printer
150cps, 80 col., 11x12-dot text. .$399

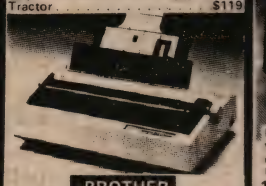


H-P LASERJET PRINTER
300cps, quiet operation, serial. $2,495
H-P LASERJET PLUS . . . . . Call



JUKI

6100 – 18 cps, 13" platen, 2K buffer, buffer, parallel. $379
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Tractor $119



BROTHER

M-1509 – 180 cps, (45cps NLQ), 132 col., friction feed and the new push type pin-tractor so first form won't be wasted. IBM and Epson FX-100+ compatible. Very quiet operation. . Dual interface . . . . . Call
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HR-15XL – 17cps wheel printer .$349
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TwinWriter – Two heads are better than one! 160cps dot matrix and 36 cps daisywheel combined into one printer. Parallel interface . . .$985
HR-25 – 23cps daisywheel, para $480
HR-35 – 36cps daisywheel, para $685
DM-40 – 160cps, 24-pin dot matrix, 136 col., with tractor, para $925

FORTIS – *by Brother*

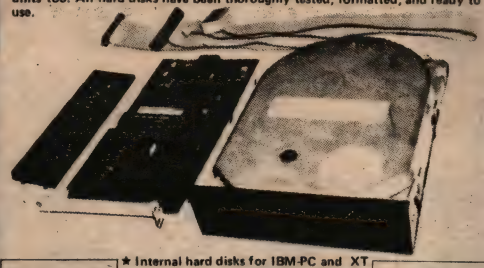
Fortis 15XL – 17cps daisywheel printer w/3K buffer. Parallel . .$SALE!
Fortis DM-20 – 160 cps dot matrix, 136 col., NLQ mode, both parallel and serial interfaces. $525
Fortis DX-25 – 25cps daisywheel, 132 column, 7K buffer, quiet operation, built-in parallel & serial. . . . . Call
Fortis DH45 – Dual head printer, 160 cps dot matrix, 36 cps daisywheel, Epson, Diablo compatible . . $999
Tractor for 15XL/HR-25. . . . . $119
Keyboard for 15XL. $149
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KX-P1091, 120 cps, 80 columns, with near letter quality mode . . $279
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HARD DISK SALE!

Now is time to upgrade your computer at tremendous savings. These compact half height hard disks consume little energy and leave room for tape backup units too. All hard disks have been thoroughly tested, formatted, and ready to use.

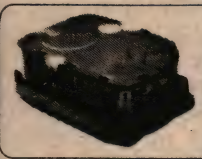


10 MB $ 389

★ Internal hard disks for IBM-PC and XT
★ Complete with controller card, cable & mounting hardware.
★ Boots directly from hard disk.
★ Low power consumption.

For AT&T 6300 or DeskPro----add $75

20 MB $ 489



HARD DISK FOR IBM-AT

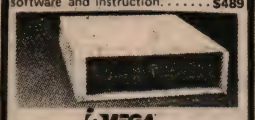
Unsurpassed in quality and savings. These are internal hard disks that can be easily installed inside the IBM-AT Complete with mounting rails.

20 MB Disctron ---- $495
CMI/Rodine $795
30 MB CMI/Rodine $925



IRWIN 10-MB TAPE BACKUP

Internal half height unit. Direct connects to floppy controller card without taking up a slot. Complete w/$30 tape, software and instruction. $489



i·MEGA

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PC-10 Copier – Manual feed, compact size . . . . . (S795) $475
PC-20 Copier – 100-sheet feeder, 1-19 copies. . . . . ($1,095) $659
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CANON LASER JET PRINTER

300cps, IBM compatible, parallel interface . . . . . $2,995) $2,395



POWER SUPPLY

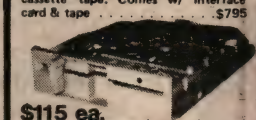
Replace the 65-watt power supply in your IBM-PC now. Comes with extra connector for additional drive or tape backup.

135-WATT ---------- $95
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$115 ea.
360K DRIVE FOR IBM-AT



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DXY-800 – 8-pen, hi-speed 180mm/sec. IBM compatible. 11x17" paper . SCall
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PC-200, 200-watt backup power supply with reaction time less than 10 millisec. Built-in surge protector . $279
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AST

Cards for IBM PC and XT w/Free Sidekick software

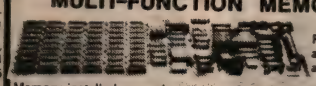


SixPakPlus Cards

Memory installed on card	64K	128K	192K	256K	320K	384K
with parallel, serial ports & clock	$219	$229	$239	$249	$259	$269
above plus game port	$254	$264	$274	$284	$294	$304

ADVANTAGE CARD for AT 128K $399 256K $429 384K $459

MULTI-FUNCTION MEMORY CARD



Fully compatible with IBM-PC and XT. Comes with Ram disk and print spooler software.

Memory installed on card	0K	64K	128K	192K	256K	320K	384K
w/parallel, serial, game ports, clock	$139	$149	$159	$169	$179	$189	$199



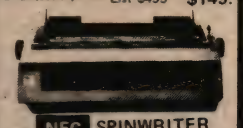
Special Purpose Cards

Hercules Graphic Card $299
Hercules Color Card – short card $159
Paradise Multi-Display Card $275
Paradise Modular Display Card . $285
Generic Color Graphics Card . . .$125
Generic Monochrome Card $135
Plantronic ColorPlus w/software .$379
Intel Above Board . . . . . Call
Orchid PC Turbo 186 w/256K . $695
Orchid PC Turbo 186 w/640K . $775
Sigma 400H Color for PGS SR-12 $499
Sigma 400L Color for Taxan 440/630/640 monitors $499
Taxan 555 Hi res. color card. . . $259
Persist BOB Board – Ultra hi res. color card. Ideal for Taxan 440 . . $479
Tecmar Graphic Master. $495
Everex Graphic Edge $399
PC Peacock Color Card. $279
AST Preview graphics w/para. . . $299
Parallel Printer Card – Half size. . $69



ADMATE DP-130

130 cps, 80 column, IBM compatible, parallel interface, complete with friction feed and the new push-type pin feed so that the first form does not have to be wasted. We made a special purchase of this superb Japanese made printer and now offering to you at a fantastic price. List $495 **$149.**



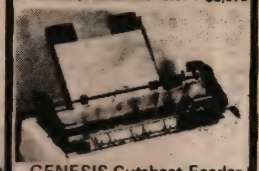
NEC SPINWRITER

3550 - 33 CPS, 203 col., proportional space, bi-directional, parallel. $995
2050 Similar to 3550 but 19 cps $625
8850 - 55 cps, 203 col. parallel $1,395



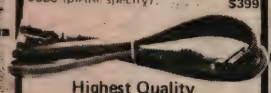
GENICOM 3404

General Electric's top-of-the-line dot matrix printer. 400 cps draft, 100 cps letter quality,136 column, tractor feed, Digital display, programmable locally or remotely. Serial interface . . $2,675



GENESIS Cutsheet Feeder

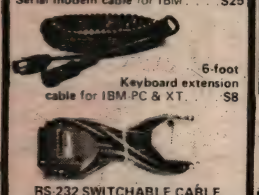
Single bin feeder,mechanically driven for high reliability no electronics, no motor. Easy installation Available for Diablo 620/630, C. Itoh F-10, NEC 3550 (please specify). $399



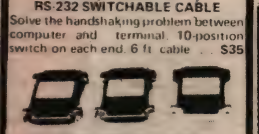
Highest Quality Shielded Cables

These cables are the very best money can buy. Lifetime warranty List $65.

Parallel printer cable for IBM . . $25
Serial modem cable for IBM . . . $25

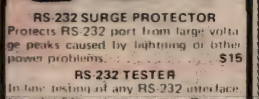


6-foot Keyboard extension cable for IBM PC & XT. . . $8



RS-232 SWITCHABLE CABLE

Solve the handshaking problem between computer and terminal. 10-position switch on each end. 6 ft cable . . $35



RS-232 SURGE PROTECTOR

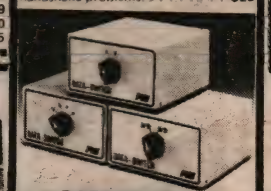
Protects RS-232 port from large voltage peaks caused by lightning or other power problems. $15

RS-232 TESTER

In-line testing of any RS-232 interface. Has 7 LED indicator lights. Requires no battery $25

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Complete with patch wires to solve all handshake problems. $25



DATA SWITCHES

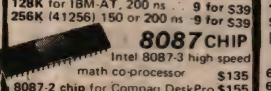
High quality rotary selector switches direct the flow of data to and from computers, printers, modems, plotters, etc. Fully shielded beige metal housing. 2 amp capacity.

DB-2525-2V (1 in, 2 out), RS232 DB-25 female connectors $95.00
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CN-3636-3V (1 in, 3 out), Centronic 36-pin female connector $145.00
CN-3636-4V (1 in, 4 out), As above but with 4 outlets. $149.00
3636-X (1 in, 4 out or 2 in, 2 out)$159



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64K (4164) 150 ns $1.50 ea. 9 for $10
128K for IBM-AT, 200 ns . . 9 for $39
256K (41256) 150 or 200 ns . 9 for $39



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Intel 8087-3 high speed math co-processor $135
8087-2 chip for Compaq DeskPro $155
80287-3 chip for IBM-AT . . . $199

IBM PC XT AT

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All systems include keyboards and disk controllers. Monitors are available at big savings too.



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XT 256K	$1795	$1950	$2395	$2550	$2995	add $650
AT 512K	$2950	$3195		$4095	$4495	avail w/1 dr. $1250



COMPAQ

Compaq Portable, 256K, 2 drives $1,975
Portable 286, 256K, 1 drive . . $3,825
Portable 286, 640K, 1.2-MB drive, 22-MB harddisk $5,350
Portable 286, 640K, 1.2-MB drive, 22-MB harddisk, 10-MB tape . $5,950
DeskPro w/256K, 2 drives . . . $1,995
DeskPro w/256K, 1 drive, a 10-MB hard disk $2,650
DeskPro w/640K, 1 drive, a 10-MB hard disk, a10-MB tape backup . $3,750
DeskPro w/640K, 1 drive, a 20-MB hard disk, a 10-MB tape backup. $4,295
DeskPro-286, 256K, 1.2-MB dr..$3,599
DeskPro-286, 512K, 1.2-MB drive, 30-MB harddisk $5,099
DeskPro-286, 512K, 1.2-MB drive, 30-MB harddisk, 10-MB tape . $5,695
Compaq amber monitor $239
Compaq DOS (needed for DeskPro) $60



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A powerful computer system with built-in high resolution graphic capability from Philips – one of the world's largest electronics manufacturers.

- IBM compatible
- 256K memory Hi res. green monitor
- 2 360K drives parallel & serial ports

limited time offer ------- **$1,695**
Above with 10-MB harddisk . . . $2,295



AMQUTE PORTABLE COMPUTERS

IBM COMPATIBLE priced as low as **$1,349**

Introducing a powerful portable computer that is smaller than the Compaq, more flexible than the IBM Portable, yet so reasonably priced!

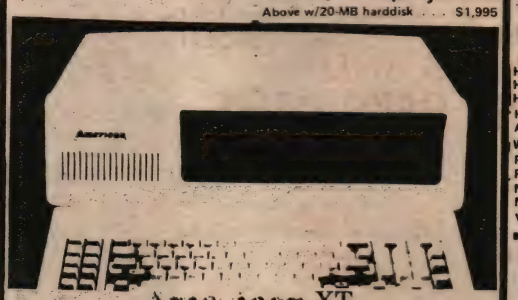
512K memory on mother board, two 360K drives ---------- $1,349
512K memory on mother board, one 360K drive, one 10-MB hard disk $1,995
Above with 20-MB hard disk ---------- $2,249



SUPER XT OFFICE COMPUTER SYSTEM

- Two 360K slim drives
- 640K memory
- parallel, ports
- 10-MB hard disk
- 8 expansion slots
- Taxan Hi Res. TTL monitor
- Hardware & software compatible with IBM-PC & XT

One year warranty *$4,500.00 value* All for only **$1,895**
Above w/20-MB harddisk . . . $1,995



American XT

Now a fully IBM XT compatible (both hardware & software) computer at an affordable price! The basic unit comes with 256K of memory, 135W switchable (110v/220v) power supply, four layer mother board with 8 expansion slots, and keyboard.

Only $595

640K memory on mother board, two 360K slim drives $875
640K memory on mother board, two 360K slim drives,10-MB hard disk $1,275
640K memory on mother board, two 360K slim drives, 20-MB hard disk .$1,395

MONITOR SALE



PGS HX-12, 12" RGB color, high resolution 690x200-dot 16-color, matching IBM case **Sale $445**

★★★★ RGB COLOR ★★★★

Fortis FC10, 13" RGB color, 680x200 dots, with green switch. . . . $375
Quimax PX-IV – 13" RGB, 720x240 line. Has green switch, tilt & swivel base $445
Taxan 425, 12" RGB color, 680x200 dots, with green switch. $445
Taxan 440, 12" super high res. RGB color monitor, 720x480 dots. Has green switch. . . . . *Sale* $499
Taxan 630 RGB Hi Res. monitor. Call
Taxan 640 RGB Hi Res. monitor . Call
Sony KV-1311CR RGB Color Monitor with Trinitron Color TV $495

★★★ GREEN SCREEN ★★★

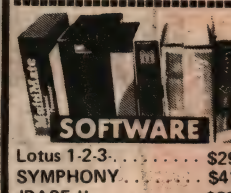
Dynax GM-120 – 12" green, composite. $99
Taxan 121, 12" green, 1000x360 dots, TTL monochrome $155
Tilt & swivel stand for above . $19
Xtron IG12X, 12" green TTL, 1000 dot, w/tilt & swivel base $129
Quimax DM-14G – 13" green TTL, 750x350 resolution, tilt & swivel base included. 1 yr. warranty$145
Roland 122G – 12" green TTL, 720 dot resoltuion $129
Taxan 115, 12" green composite .$125
IBM Monochrome, 12", 720-dot .$255

★★★ AMBER SCREEN ★★★

Amdek 300A, 12" amber . . . $149
Amdek 310A, 12" amber, 900 dots, non-glare screen, runs off IBM monochrome interface board .$169
Quimax DM-14A – 13" amber TTL, 750x350 resolution. Tilt & swivel base included. 1 yr warranty.$149
Xtron IG12X, 12" amber TTL, 1000 dot, w/tilt & swivel base $129
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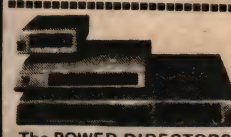
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Some Fine Points of Pascal

Part I

by Randall Staponski

Pascal has become popular partly because it represents a way to get involved in a structured language. The availability of Turbo Pascal at a reasonable price (about $50) for CP/M, MSDOS, and PCDOS means it doesn't cost an arm and a leg to try.

The intent of this article is to discuss the structured programming technique called top down design as well as some of the nitty gritty details of functions and procedures. Top down design is not a part of the Pascal language. Instead, it is a method used to write code and can be used when programming in other languages as well. Part one of this two part series will discuss some of the finer points of using Pascal's version of the subroutine called the function. The peculiar ability of a function to call itself will also be discussed and illustrated with an example. Part two will examine the souped up version of the function called a procedure. Use of procedures will be shown using a program called IRSGOTYA.

Selection of an example to use is difficult.

Interesting examples are often too complex to illustrate programming details and simple examples may be boring. I have written programs to convert Farenheit temperatures to Centigrade temperatures (and vice versa) in three languages. The first time was mildly interesting while the last two were down right boring.

As a compromise example, my wife's Buick has a chrome plate which says the engine size is 3.8 liters. However, oil and air filters for her car are listed at part stores by engine size in U.S. units - namely cubic inches. It is hard to select parts when I am talking metric units and the parts people expect the usual units of cubic inches. A program to convert liters to cubic inches and vice versa will help. It will also allow comparison of engine sizes between the older U.S. car engines (specified in cubic inches) and newer U.S. cars or foreign cars which are specified in liters.

As the name implies top down design begins at the top with a general statement of the job to be done. The first step was completed in the previous paragraph. This step is called level 0 (programmers never start anything with 1). Subsequent steps break the general statement down into more and more detail until the last level is a mixture of English and Pascal like statements called pseudo code.

For example a pseudo statement within a top down design might be:

sum and print the big three U.S. car production in 1984.

The actual Pascal code for this statement might be:

```
TOTCARS84:= 0.0;
TOTCARS84 := GMCARS84 + FORDCARS84 + CHRYSLERCARS84;
WRITELN ('TOTAL BIG THREE U.S. 1984 CAR PRODUCTION IS:
',TOTCARS84;
```

The purpose of top down design is to reduce the amount of time necessary to write and debug a program. It does this by starting with the total picture and gradually narrowing the focus until pseudo code is produced. The programmer has a detailed outline by the time code is actually being written. As will be seen, Pascal offers some tools which encourage a modular approach by making each module as independent as possible. Top down design does not restrict programming style. Two programmers working independently on the same program will undoubtedly still arrive with two different programs. Programming is still very much an art.

Figure 1 shows the top down design for the first example. Level 0, at the top, is the objective which is to convert liters to cubic inches and vice versa.

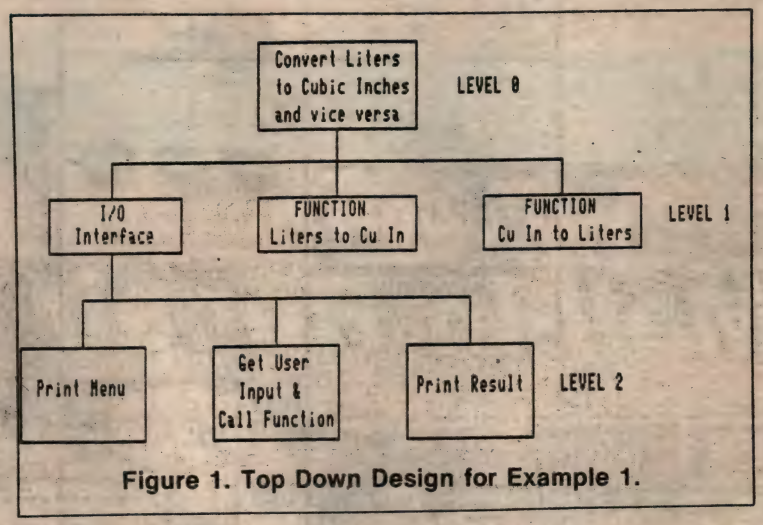


Figure 1. Top Down Design for Example 1.

Level 1 shows the next level of detail. Level 1 consists of 3 tasks which serve to further break down the level just above it (level 0 in this case). The I/O interface handles user input and program output. Going across, the two functions LITERS TO CUBIC INCHES and CUBIC INCHES TO LITERS will be supplied with a number to be converted, convert the number, and pass it back to the calling line. The two functions can be expressed in one line so there is no need to break them down further.

The I/O interface is detailed one step further in level 2 and consists of printing the menu, getting user input, and calling the appropriate conversion function. This is followed by printing the results. The menu only contains three items as shown in listing 1 lines 27 to 29. Line numbers are not used in Pascal but are shown here for line identification only. Two user inputs are necessary: the type of conversion desired and the number to be converted. Based on user input, the appropriate conversion is performed and the result printed. Note the descriptions in the top down design for this example do not resemble Pascal code. In a larger more complex program additional detail would probably be necessary. Also in the real

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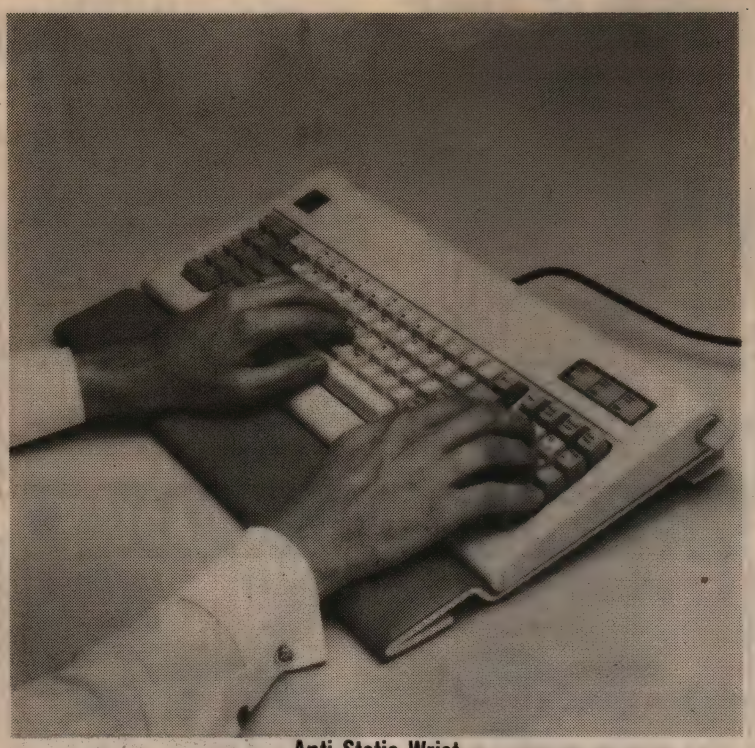
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Some Fine Points

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world, the top down design for a problem this size can be thought out instead of written down. The objective has now been broken down into modules, which due to Pascal's modular approach, can just about be coded one at a time. The number of levels and degree of detail in the top down design will vary with the experience and style of the programmer.

The conversion program uses two functions. A function is designed to receive one or more input values, make a calculation, and return one item (usually a number) to the calling line. Line 40 shows the call to function CUIN_TO_LITER. The call is within a WRITE statement. When called, the function name is treated like a variable name. That is, the value is returned in the function name. In fact line 9 defines CUIN_TO_LITER as being of type real. The function CUIN_TO_LITER can then be called anywhere a real variable may be used except on the left hand side of an equation.

Information is given to the function through a parameter list immediately following the function name. In this case there is only one number required by either function (either liters or cubic inches). The main program places this input into the real variable CONVALUE in lines 37 and 48. CONVALUE is given to the function by placing it in parentheses in the calling line. The item or items within the parentheses are called the parameter list. The function receives the value in line 9 through it's own parameter list which in this case is the variable CUIN. CUIN is declared to be of type REAL. As you can see the calling lines (40 and 51) pass CONVALUE to both functions. CUIN_TO_LITER maps CONVALUE into another variable called CUIN. Pascal refers to variable names as identifiers. Within the function, CUIN is defined. It is not known outside the function. The flexibility, in effect, to rename a variable received by the function allows the use of meaningful names within a function. In this case CONVALUE is mapped into CUIN (cubic inches) which is to be converted to liters. Similarly function LITER_TO_CUIN receives CONVALUE from the calling line and maps it into LITER.

Pascal does not require you to use different identifiers in the function parameter list, though doing so, allows you to choose a more appropriate name. CONVALUE is useful when writing or modifying the main program since it stands for the value to be converted. However, when control is passed to the function, a better description of the passed variable is very useful when initially writing the function or 6 months later when modifying it. As will be seen in part two, there are other reasons for using different identifiers in the function parameter list.

As it turns out the 3.8 liter engine in my wife's car is equivalent to 231.9 cubic inches and lo and behold, 231 cubic inches is the number understood by the parts store people. The 302 cubic inch engine in my dad's full size Ford is equivalent to 4.9 liters. While the size of engines is generally small in newer cars, I was surprised to see a 6.2 liter (378.3 cubic inches) diesel engine in a 1985 Cheverolet Suburban. However, all of these are small compared to the 454 cubic inch (7.4 liter) Buick Wildcat I learned to drive in some years ago.

Programming languages usually have one or more surprises and Pascal is no exception. Pascal is the first one I have used that allows functions to call themselves to solve recursive problems. Granted, special conditions are necessary, but it is still amazing to me.

Recursion in the general sense means to occur several times. In this case the meaning is more precise. In Pascal a function or procedure can call itself to perform an activity, determine that more information is needed, remember what is to be done, call itself again to perform an activity, determine that more information is necessary, remember what is to be done, etc. This cycle continues until sufficient information is available such that the last function call can be answered. Each unanswered function call and pending calculations are then answered in reverse order until all calls have been answered and control returns to the calling line with an answer. Each unanswered function call and associated pending calculations require computer memory during execution. On my North Star Advantage with 64K RAM this has not been a limiting factor.

The classic example used to illustrate recursion is a function to determine exponents of the type X. The classic homework problem is to write a recursive function which calculates factorials. So to be a little different the factorial function will be illustrated. Since this is a very short program top down design will not be shown.

Factorials often appear in equations that determine the

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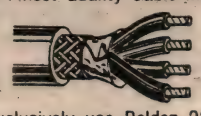
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Some Fine Points
continued from page 100

number of ways n different objects can be ordered using r of them at a time. An example is 3 factorial which is written as 3!. It is defined as 3x2x1x0! = 6. By definition 0! = 1. Five factorial would be 5x4x3x2x1x0! = 120. For computational purposes 1! and 0! are not important since they multiply by 1 and do not change the answer.

The heart of recursion requires the function to be executed again and again until the last call is answered. Then in reverse order the last answer is used to answer the next to

continued on page 116

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- 16 bit 8088 microprocessor with 8087 co-processor optional.
- 8 Expansion I/O Slots
- Fully IBM PC/XT compatible
- Same Dimension as IBM PC/XT
- IBM PC/XT compatible.

SYSTEM CONFIGURATION

☐ STARTER SYSTEM $745
- 256K memory on board
- One DS/DD slim drives
- Floppy disk controller
- Color graphic card (or monochrome card)

☐ MONO SYSTEM $945
- **640K memory on board**
- Two DS/DD slim drives
- Floppy disk controller
- Monochrome card
- Parallel printer port
- TTL High Resolution Monitor

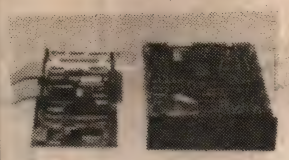
☐ COLOR SYSTEM $1195
- **640K Memory on board**
- Two DS/DD Slim drives
- Floppy Disk Controller
- Color Graphic Card
- RGB Color Monitor

☐ BUSINESS SYSTEM $1499
- **640 K Memory on Board**
- Two DS/DD Slim Drives
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- Game port
- 10 MB Hard Drive
- TTL High Resolution Monitor (or Composition Monochrome Monitor)

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mega AT



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FEATURES:
- IBM PC/AT Compatible.
- Intel 6 MHz 80286 microprocessor. Up-gradable to 8 MHz CPU, which will increase the speed of the CPU cycle up to 33% faster than that of an IBM AT.
- 640 KByte standard main memory on board, eliminates the need to have additional memory adds-on in the 8088 compatible real address mode. Main memory up-gradable to 1 Mbyte on board, 16 Mbyte in system in a protected virtual address mode.
- 4 sockets for 64 Kbyte system EPROM/ROM, expandable to 128 Kbytes.
- 8 I/O expansion slots: 2 with a single 62-pin connector, 6 with dual 62-pin and 36-pin connectors.
- CMOS clock/calendar circuit provision
- On-board battery socket, eliminates the need for external cable (The user may install an IBM AT type battery as an alternative to the on-board battery).
- Socket for the 80287 math coprocessor.
- 3 programmable timers available.
- 7-channel direct memory access (DMA).
- 24-bit addressing, 16-bit data path
- 16-level interrupt
- speaker/keyboard connector
- standard power connector.

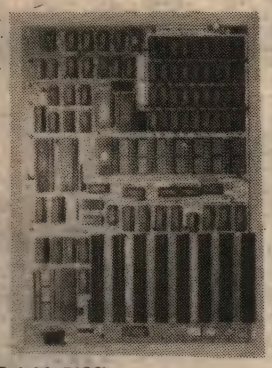
SYSTEM CONFIGURATION

☐ BUSINESS SYSTEM $2150
- 640K Memory on board
- One 1.2 MB floppy drives
- Floppy & Hard drive controller
- Color Graphic Card (or monochrome card)
- Monochrome Monitor (TTL or Composite)

☐ ENHANCED SYSTEM $2650
- 640K Memory on board
- One 1.2 MB Floppy Drive
- Floppy & Hard Drive Controller
- 20MB Hard Drive
- Color Graphic Card (or monochrome card)
- Monochrome monitor (TTL or composite)

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- 8 EPROM sockets
- Manual & schematics included

ASSEMBLED & TESTED (with BIOS)

With 256K on Board $265
With 640K on Board $349

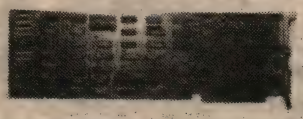
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DISK I/O CARD $129



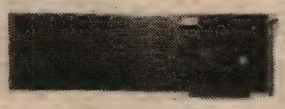
- Handle 2 Floppy Drive
- 2 Serial (2nd optional)
- 1 Parallel
- Game Port
- Clock/Calendar
- w/software, manual & cables

COLOR GRAPHIC CARD $95



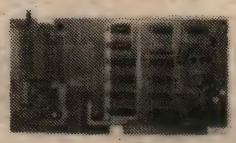
- RGB & composite
- w/Light Pen & RF Modulator ports
- 640 x 200 resolution

512K MEMORY CARD (OK) $59



- Memory Expansion to 512K
- w/Manual

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- EEprom 2816 & Compatible
- CMOS Eprom 27C32-27C128
- w/software & manual

FLOPPY DISK CONTROLLER $59



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- w/cable

384 K MULTIFUNCTION CARD



W/OK $125
W/384K $175

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- w/software, manual & cables
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- Parallel
- Clock/Calendar
- Game Port
- Ramdisk & PSpool

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6. Flip Top Metal Case w/speaker
7. 135W Power Supply
8. Keyboard

Monochrome Monitor Additional $99

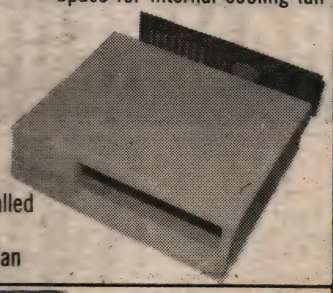
CASES



$69 FLIP TOP

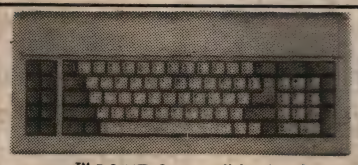
- Open From Top for Easy and Quick Access to Inside
- Can Be Used for Standard IBM™ PC/XT Mother Board or Mega™ Board
- Mounting parts included
- Space for internal cooling fan

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- Same Styles as IBM™
- Slide Out Metal Case
- Additional Cooling Fan for System Board Can Be Installed
- Mounting parts included
- Space for internal cabling fan

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$79

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- Big shift key
- 5151 Keyboard ... $109
- AT Style Keyboard $109

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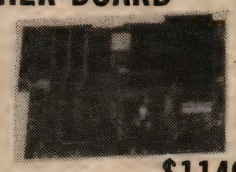


135W $89
150W $109

- 4 Drives Power Plug
- Side Switch Model Has The Same Dimension & Power Plug as IBM Power Supply
- Back Switch Model Fits Mega Case Perfectly

PC/AT COMPATIBLES

● PC/AT MOTHER BOARD

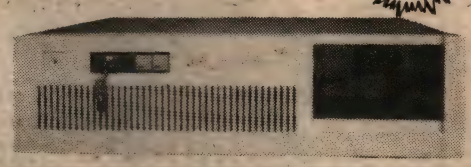


- IBM AT Compatible
- 80286 Micro Processor w/80287 optional
- 640K Standard, expandable to 1MB on board
- On board clock
- 8 I/O slots

$1149

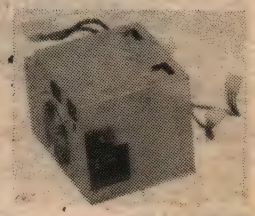
● PC/AT COMPATIBLE CASE

SALE



$109

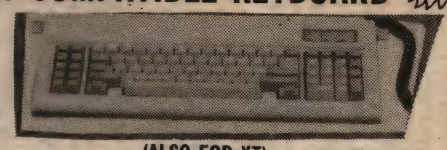
● 200W PC/AT POWER SUPPLY



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● PC/AT COMPATIBLE KEYBOARD

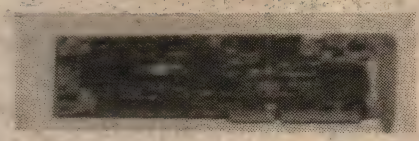
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$109

(ALSO FOR XT)

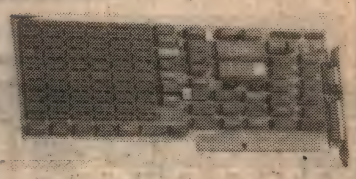
FLOPPY & HARD DRIVE CONTROLLER $329 (Western Digital)



1.5 MB MULTI FUNCTION

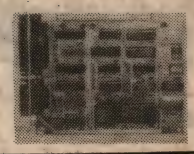
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- Parallel • Game port

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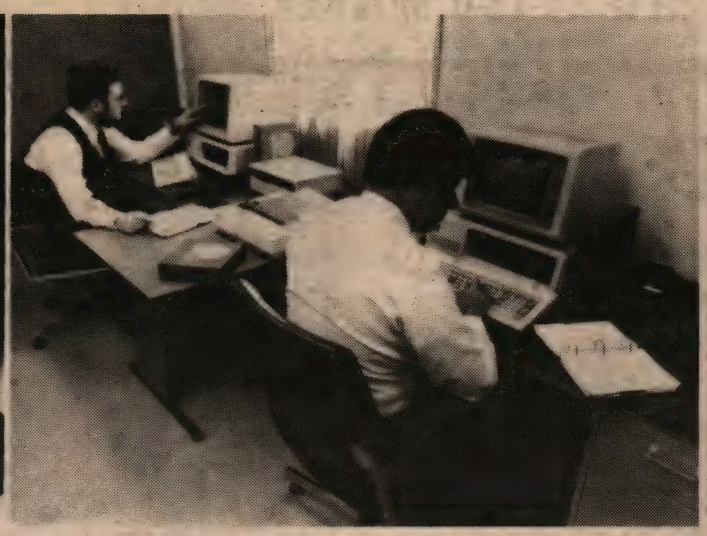
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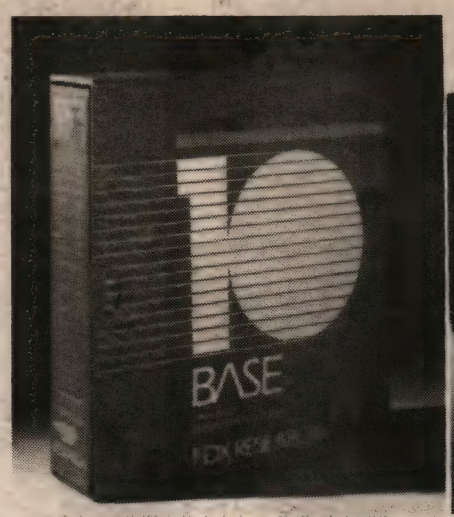
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Fox Research, Inc., now offers a PC implementation of SQL (Structured Query Language, often called Sequel), a database query facility developed by IBM for mainframes. The fox implementation offers the power of this English-like fourth-generation rdbms (relational database management system) programming language to users of IBM® PC, XT, PC/AT or compatible systems (under DOS 2.0 or higher) through easy menu access. The 10-BASE™ Multi-User Relational Database Management System is available for $895 (all prices suggest US resale) at participating distributors, dealers and resellers; dealer, OEM and VAR inquiries invited.

English-like SQL commands simplify and enhance 10-BASE file access and operations. Within this almost conversational environment, single commands can create, modify, update, query or delete files; the five most often-used commands are **Select, Delete, Update, Format** and **Print.**

10-BASE also offers SQL's relational capabilities for simultaneous access to multiple files and records. A unique

continued on page 107

dBASE II PROGRAMMERS

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CHECK provides easy maintenance and debugging of dBASE II command files by identifying improper nesting of conditional commands and indenting for each additional nest. When a nesting error is located, you are provided with the correct logical closing based on the last conditional command being processed. Execution speed may be improved by optionally removing comments, blanks, and tabs from your program. Leading command words are reduced to four characters and may be output in upper or lower case. File size is further reduced by eliminating the continuation symbol ';'. Extensive parameters may be passed in the command line for ease of use and flexibility from a system prompt. Batch processing is accomplished by using a 'CHECK' file containing the desired commands. Results may be displayed on the screen or suppressed to decrease execution time. Errors may be placed on the screen with pauses or sent to the printer for unattended operation. 'Quick' check in memory at speeds up to 5000 lines per minute on a 8mhz 80186 and 8" floppy drives. As an added feature, bit seven and WordStar hyphens may be stripped from corrupted files. Cost is $49.00.

ART

ART is a RunTime command file providing the ability to use dBASE II RunTime from a ':' prompt. Source code and RECODE are included allowing you to customize the program. ART costs $29.00, with documentation in a disk file.

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REPAIR recovers dBASE II '.DBF' files by: resetting the record counter in the header, offsetting any number of characters starting at a specified record number, and removing imbedded end of file markers. The program requires about four seconds for each 1K; as, each byte must be individually checked. An on-line 'HELP' function provides all necessary documentation for program operation. Order now, so you will have it when you need it. Cost is $29.00.

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DECODE unscrambles dBase II RunTime '.CMD' or '.PRG' files into ASCII text source files. It will not decode the linked command files used in the sixteen bit dBASE II 2.43 RunTime or the Champion Accounting program. RECODE scrambles your modified ASCII command files back into RunTime format. Batch processing, command line options, and printer options are similar to those in CHECK. Scrambled files may be run on regular versions of dBASE II 2.4, 2.41, and 2.43. DECODE and RECODE together cost $49.00.

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Wyse Technology Introduces High Resolution Monitor



Wyse Technology recently introduced the WY-700, a new high-resolution, 15-inch monochrome monitor and graphics board subsystem for personal computer users requiring both high-resolution graphics and the ability to run all IBM Personal computer-compatible software.

The new WY-700, which offers the first combination of high-resolution graphics (1280 by 800) and full IBM PC compatibility, runs on the IBM PC, PC XT, PC AT, the WYSEpc and other PC compatibles.

The WY-700 graphics subsystem is priced at $1,595. It is targeted to computer-aided design (CAD) applications and other areas requiring high resolution graphics, including graphics-based operating environments with windows and computer-aided publishing.

"In the past, customers wishing to use the same monitor to run IBM-compatible software and packages requiring high-resolution graphics were unable to do so," said Chuck Comiso, Wyse vice president of marketing. "The 700 will offer our customers a 'one monitor' solution, and do it at a price that is substantially less than competitive monitors with similar levels of graphics resolution."

The new monitor uses white phosphor and advanced interlaced technology to create a sharp, flicker-free display without "ghosting" (faded remains of text as the screen scrolls). It also takes advantage of techniques already used by Wyse in producing terminals to increase the speed of the display for refreshing (maintaining a clear, vivid display and scrolling.

The 15-inch monitor has a bit-mapped graphics board that uses one slot in the personal computer. When running IBM's Color Graphic Adapter (CGA) applications, the WY-700 monitor maps colors into four shades of gray. All CGA and monochrome adapter applications can be run on the monitor. When running IBM's monochrome adapter applications, the WY-700 displays extremely high resolution (16 by 32 pixel characters). The WY-700 board automatically switches between various resolutions to accommodate a range of user applications.

WY-700 Applications

The primary applications for the WY-700 monitor will be those requiring high-resolution graphics on a personal computer. The major target markets for the new monitor will be CAD engineering applications, graphics-based operating environments, such as Microsoft's Windows and Digital Research's GEM, and computer-aided publishing.

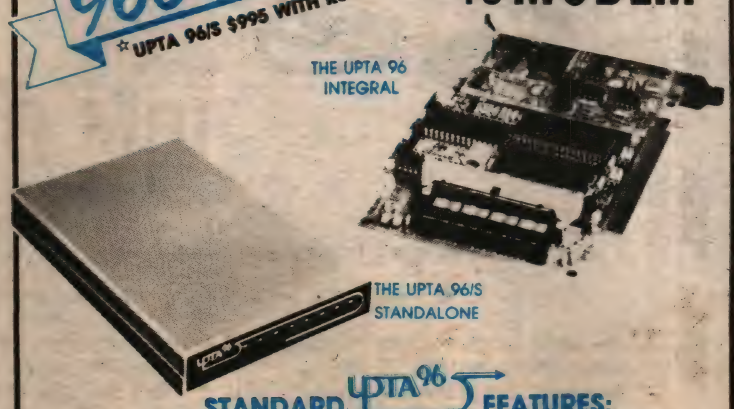
Price And Availability

Wyse's WY-700 monitor, priced at $1,595, is now available.

For additional information contact Wyse Technology, 3571 N. First Street, San Jose, CA 95134, (408) 433-1000.

Mention that you read about it in the *Computer Shopper*. ●

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5.25" DSDD, SOFT SECTOR, w/hub ring	1.28	1.11
5.25" DSQD, SOFT SECTOR, w/hub ring	1.88	1.59
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WATFOR-77 for the IBM PC

WATFOR-77, the latest member of the WATFOR family of FORTRAN compilers, has been released by WATCOM Products for the IBM PC DOS operating system. Like the VM/SP CMS version, it supports the full FORTRAN 77 language standard. Like other WATFORs, it greatly reduces the program-development cycle.

The original WATFORs, developed by the University of Waterloo, contributed greatly to the widespread use of FORTRAN. They combine superior error detection with fast compilation directly into memory where the program can be immediately executed. Consequently, they have been widely adopted by educational institutions, business and government wherever a substantial amount of FORTRAN programming is undertaken.

WATFOR-77 was developed by WATCOM Systems. The programming team was led by individuals who had worked on other WATFOR processors; thus, the compiler maintains the same high standard of proficiency established by its predecessors over the past 25 years.

Like its predecessors, WATFOR and WATFIV, the compiler shortens the time spent to develop FORTRAN programs. A program is compiled directly into the computer's memory and then executed. WATFOR-77 emphasizes fast compilation and good diagnostics. It generates reasonably efficient program code which can outperform certain compilers on the IBM

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SideDialer Provides Low-Cost Dialing For SideKick

Quadtel Corporation has developed a low-cost telephone dialer product called SideDialer for the IBM PC, XT, AT and compatible computers. SideDialer consists of a half-sized dialing expansion card and a software package that provides dialing with SideKick and other desktop managers and application programs.

The SideDialer, with a suggested retail price of $54.95, was designed for users who want to use the telephone dialing features of SideKick or another desktop manager, but do not want or need a modem which is much more expensive.

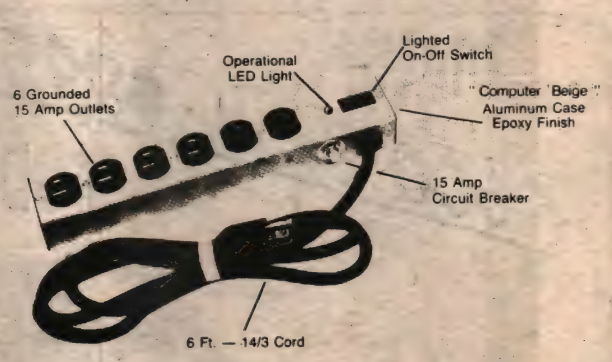
Once the SideDialer software is loaded, both the screen dialing and directory dialing features of SideKick can be used. No modifications need to be made to the SideKick program. This allows the Side-

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Multi-User
continued from page 104

"Logical View" operation lets users define different views of their data without duplicating that data. The dbms uses B-tree indexing for extremely fast access to information, even in very large databases; indexes are updated automatically as new information is added. And 10-BASE can import data files from SuperCalc® , VisiCalc® , WordStar® , Lotus 1-2-3™ and other applications using DIF™ and delimited ASCII files.

A **Forms Manager** facility built-into 10-BASE makes it easy to create custom data entry and inquiry screen forms; these may be personalized to an individual application or made to mimic forms with which users are already familiar. Forms can embed single or multiple SQL commands (with no limit on their number), making it easy to automate often-needed operations. Each free-form screen may be "painted" as desired; further, any form can include an unlimited number of screens. Up to 100 forms can be chained together to create a new form, and the number of forms per file is unlimited.

Despite the intrinsic sophistication of SQL, Fox Research's implementation in 10-BASE offers easy menu access to database operations plus extensive help, including user-definable help for user databases.

10-BASE follows mainframe relational database conventions in keeping data in tables (one per file), arranged as column (fields) and rows (records), with field names and relationships maintained in a separate data dictionary file.

The capacity of a 10-BASE database (fields per record, records per file, indexes per file and files per database) is functionally limited only by the memory and storage limitations of the host PC system.

10-BASE boasts a calculational accuracy to 14 digits, can sort on as many as five simultaneous (nested) sort keys, and can access as many as 16 tables (files) on each query.

10-BASE supports multiple simultaneous users, file sharing and record locking. It is compatible with Fox Research's 10-NET™ LAN (local area network), available separately for $695 per user node.

Minimum 10-BASE system requirements are an IBM PC, XT, PC/AT or compatible; DOS 2.0 or higher; 320K of RAM and two disk drives.

For additional information contact Fox Research, Inc., 7005 Corporate Way, Dayton, OH 45459; (513) 433-2238.

Mention that you read about it in *COMPUTER SHOPPER*.

Plains & Simple
continued from page 96

Computer, said, "Great Plains' Plains & Simple is a valuable addition to the collectin of Macintosh business management power tools. Because it recreates the familiar one-write system, it lowers the learning time barrier and makes the power of the Macintosh accessible to small businesses — immediately."

According to Plains & Simple product manager Thor Iverson, the software is designed to have the customer up and running the same day it is received. Even if the customer has never used a computer or manual one-write system before, he will find Plains & Simple easy to learn.

"Plains & Simple includes general ledger, accounts receivable and accounts payable all in one package. The product was designed to be three-in-one from the start to save time and add simplicity. In fact, customers can have information available from all three functions on the screen at the same time," he added.

Great Plains reported one-write systems are used in virtually every type of small business. However, manual one-write systems are found in the offices of dentists, physicians, lawyers and accountants more often than any other manual accounting method. The many small businesses that use manual one-write systems are the primary customers for a Macintosh-based one-write system, the company revealed.

Plains & Simple can pay for itself within a matter of months, the software company

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MicroTalker IV Drops Per User In-Cost For Multi-Port Voicemail

Microtel, Inc. announced immediate availability of the MicroTalker IV, a low cost, multi-port voicemail system. The system can be configured with two to four ports, with each port handling a dedicated phone line. In the four port configuration, the system will handle up to 300 users.

"That is 300 users in a single PC box," says Microtel President Jim Hoback. "The news isn't multi-port, that's been around for a while, the news is the extremely low cost per user and the added flexibility multi-port operation provides for support of a voicemail network. In a fully loaded four port system, the in-cost per user is only $65.00," Hoback said.

Most existing multi-port voicemail systems are hosted in dedicated mini-computers, and prices range from $40K to over $100K. At $19,800 for a full feature four port system, the MicroTalker IV offers the same functionality at a much lower price, according to Hoback.

"We've got the same benefits & features as the higher priced systems. The MicroTalker IV is a fully integrated voicemail system designed for maximum communications efficiency," he said.

The MicroTalker IV gives each user an individual mailbox, an unique announcement message that can be changed at any time, voice prompts to guide the user through leaving one or multiple messges for anyone or any group in the network--retrieving his own, and all functions can be performed in a single phone call. And, with multi-port, any user on any line has access to anyone in the network, according to Hoback.

In addition to standard voicemail features, the MicroTalker IV provides a very sophisticated message notification facility. "The type of complex, call progress detection required to enable this function is not commonly available even in much higher priced systems," Hoback said.

Message notification allows a user to individually define when and where he wants the system to call him when he receives a message on the central system. MicroTalker IV will call the user at the appointed time and place. Once the user identifies himself to the system, he can receive his messages--and perform any other system function he chooses; reply, send other messages, etc.

Microtel has been shipping a single-line voicemail system since October 1984. Both the MicroTalker products run on any IBM PC or compatible with a hard disk. Packages consist of either a software component and a voice applications peripheral board for the Microtalker I, or a fully integrated computer system for the MicroTalker IV, both supplied by Microtel. Prices range from $695 for a single port MicroTalker I to $19,800 for a full function, four port MicroTalker IV.

For further information contact Microtel Inc., 40 West 27th Street, 4th Flr., New York, NY 10001, (212)684-4440. ●

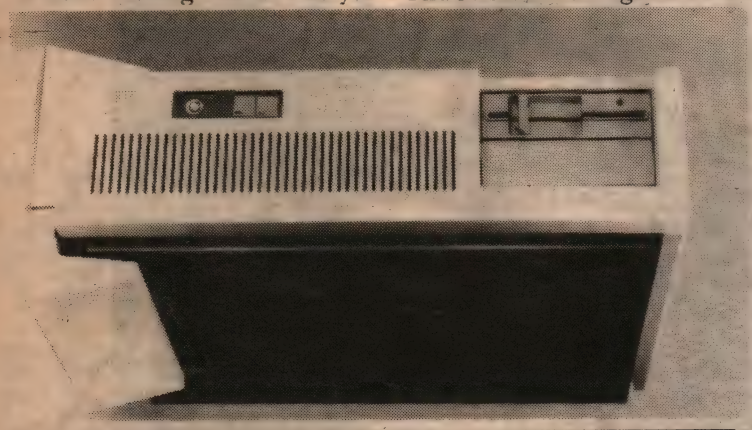
Kensington Microware
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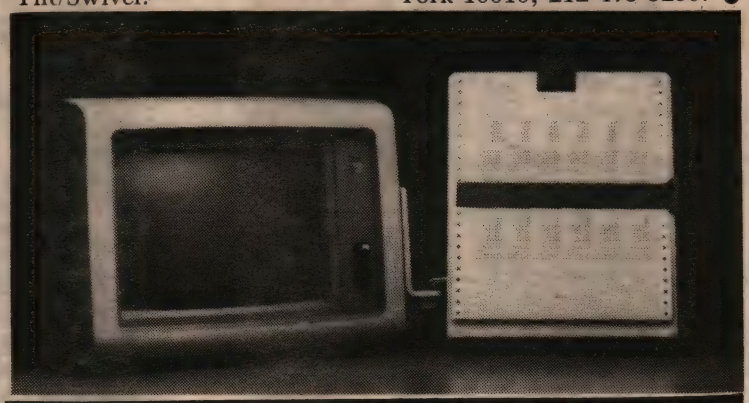
of typing, minimizing user fatigue and typing errors. Designed to fit IBM PC/XT, PC/AT and compatible keyboards, the Wrist Rest provides a soft resting place for wrists during data entry. Covered with a grounded antistatic mat, the wrist rest automatically discharges static electricity. $49.95 list price.

The Space Saver is a value pack containing the Universal System Stand and Universal Tilt/Swivel - a logical combination, since anyone using a System Stand needs a Tilt/Swivel to raise their monitor back to the proper height. The Space Saver retails for $79.95, a $10 savings off the individually purchased price of the Universal System Stand and the Universal Tilt/Swivel.

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For further information, contact Kensington Microware, Ltd., 251 Park Avenue South, New York, New York 10010, 212-475-5200. ●





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Universal Sorting

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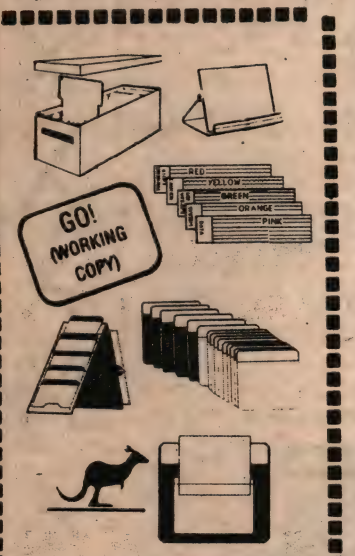
name.) A record is read from the original file and then a GOSUB 61100 is executed. At this time this subroutine extracts only the data which is to be used as a sort key and converts it into the string SSORT$(1). Upon return to the sort module SSORT$(1) is placed in buffer #2 and written to the file which will actually be sorted. By using a file containing only the sort keys the sort operates faster as less data must be checked and as the data is already arranged in the proper order for comparison. If the file is to be sorted on only a single key data field and if that field is string data, this subroutine is extremely simple; sorting on several fields and/or numeric fields can make this procedure a bit more complex. The example procedure beginning on line 59100 illustrates a sort on four data keys, three of which are numeric. Additionally, the example allows a choice of sort parameters where the key sort fields are ordered differently. For more precise explanations of these topics, see the appropriate following instructions. The primary purpose of this subroutine is to take the data which has been read from the file to be sorted, use only the fields which represent the sort keys and concatenate these fields to the string SSORT$(1). The length of the concatenated

continued on page 112

```
10 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
30 REM X                                                              X
40 REM X To test the various sample user written subroutines          X
50 REM X insert a GOSUB 59_00 or GOSUB 60_00 and RETURNs as X
60 REM X the first two lines of the subroutines at 61_00              X
70 REM X lines.                                                       X
80 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
90 REM
100 REM >>> Write test data file <<<
110 CLS: INPUT "Do you wish to write sample test
  datafile? (Y/N) ",A$
120 IF ((A$="N") OR (A$="n")) THEN GOTO 230
130 INPUT "Write how many records to test file? ",R%
140 PRINT "Test file name is: 'TEST.ASC'": PRINT "Writing test
  file records ";
150 RL%=25: OPEN "R",#1,"TEST.ASC",RL%
160 FIELD #1, 1 AS RS$,10 AS ST$,2 AS IN$,4 AS SP$,8 AS DP$
170 FOR X=1 TO R%: LSET RS$="A"
180 S1$="": IF ((C%<65) OR (C%>122)) THEN C%=65
190 FOR Y=1 TO 10: S1$=S1$+CHR$(C%): C%=C%+1: NEXT Y
200 S!=1.33#X: D#=5.553#X
210 LSET ST$=S1$: LSET IN$=MKI$(X): LSET SP$=MKS$(S!):
  LSET DP$=MKD$(D#)
220 PUT #1,X: PRINT ".";: NEXT X: CLOSE: PRINT " FINISHED"
230 REM >>> Go into sort procedure <<<
240 CLS: PRINT "Which 'user-written' subroutine examples are
  to be used?"
250 PRINT "1 = Default set at 61000, 61100, 61500, 61600"
260 PRINT "2 = GOSUBs from 61000s to 60000s"
270 PRINT "3 = GOSUBs from 61000s to 59000s": PRINT
280 INPUT "Choice... ",EX
290 IF ((EX<1) OR (EX>3)) THEN GOTO 240 ELSE
  ON EX GOTO 300,310,320
300 SBYTES%=10: GOTO 330
310 RL%=25: WHICHFILE%=2: SBYTES%=15: NAME "TEST.ASC"
  AS "FILE-2.DAT":GOTO 330
320 RL%=25: SBYTES%=40: SORTBY%=2: FILENAME$="TEST.ASC"
330 GOSUB 61000: REM Get number of records in file SFILELEN%
340 INPUT "1 = Forward sort       0 = Reverse sort
  Choice: ",SPROCEDURE%
350 IF ((SPROCEDURE%<0) OR (SPROCEDURE%>1)) THEN GOTO 340
360 PRINT "Which sort is to be used: "
370 PRINT "1 = Quick Sort (62000)": PRINT "2 = Merge sort
  (63000)": PRINT "3 = Priority queue sort (64000)": INPUT
  "Choice... ",USESORT
380 IF ((USESORT<1) OR (USESORT>3)) THEN GOTO 360
390 ON USESORT GOSUB 62000,63000,64000
400 ON USESORT GOTO 410,420,410
410 ERASE SCOMP%,SNEWORDER%,SSORT$,SASECTION%: GOTO 430
420 ERASE SCOUNT%,SNEWORDER%,SSORT$
430 REM >>> Read sorted datafile <<<
440 GOSUB 61500: REM Open & field SSORT.$$$
450 FOR X=1 TO SFILELEN%
460 GET #2,X: ON EX GOTO 470,480,490
470 PRINT CR$, CVI(IT$), CVS(SP$), CVD(DP$):GOTO 500
480 PRINT S1$, CVI(I1$), CVS(S2$), CVD(D1$): GOTO 500
490 PRINT S1$, CVI(I2$), CVS(S2$), CVD(D2$)
500 IF (X MOD 20=0) THEN INPUT "Press (CR) when ready...",A$
510 NEXT X: CLOSE: END

58000 REM    XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
58002 REM    X                                                             X
58004 REM    X      UNIVERSAL SORTING PROGRAM MODULES                      X
58006 REM    X                                                             X
58008 REM    X              Copyright (C) 1985 by                          X
58010 REM    X         Frank Dutton, Houston, TX  77063                    X
58012 REM    X                                                             X
58014 REM    XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
58016 REM
58018 REM    XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
58020 REM    X      UNIVERSAL SORTING PROGRAM MODULES                      X
58022 REM    X                                                             X
58024 REM    X      EXAMPLE USER-WRITTEN SUBROUTINES                       X
58026 REM    X                                                             X
58028 REM    X      The subroutines beginning on lines                     X
58030 REM    X   nn000, nn100, nn500, nn600 are presented                  X
58032 REM    X   as examples of the subroutines which the                  X
58034 REM    X   user must write to work with the sorting                  X
58036 REM    X   module.  59000, 60000, 61000 are examples                 X
58038 REM    X   illustrating ways to open and field a file                X
58040 REM    X   which is to be sorted and determines the                  X
58042 REM    X   number of active records in it.  59100,                   X
58044 REM    X   60100, 61100 are examples which are used to               X
58046 REM    X   convert the data in the fields which are                  X
58048 REM    X   designated as sorting keys into a single                  X
58050 REM    X   string of data which is used by the sort                  X
58052 REM    X   routine.  59500, 60500, 61500 all are used                X
58054 REM    X   to illustrate opening a file to which the                 X
58056 REM    X   sorted records are written - the original                 X
58058 REM    X   file to be sorted is preserved by this                    X
58060 REM    X   module and may be destroyed by the user's                 X
58062 REM    X   program when it is determined that the sort               X
58064 REM    X   was successful.   59600, 60600, 61600 each                X
58066 REM    X   read the record data from the file TO BE                  X
58068 REM    X   sorted to the buffer for the SORTED file.                 X
58070 REM    XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
59000 REM >>>>> Open & field file to be sorted <<<<<
59002 OPEN "R", #1, FILENAME$,RL%: REM RL% = Record length
59004 FIELD #1, 1 AS RS$, 10 AS ST$, 2 AS IN$, 4 AS SI$,
  8 AS DP$
59006 SFILELEN%=LOF(1)\RL%: REM If LOF does not return length
  of file in BYTES this calculation must be changed
59008 REM RS$ shows status of records.  Determine # records
59010 IF SFILELEN%>0 THEN GET #1,SFILELEN% ELSE GOTO 59014
59012 IF RS$<>"A" THEN SFILELEN%=SFILELEN%-1: GOTO 59010
59014 RETURN
59100 REM >>>>> Construct SSORT$(1) from sort key data <<<<<
59102 REM Using SORTBY% in line 64115 this subroutine allows 4
  sorting combinations; the proper figure for SBytes% must have
  already been set within the host program
59104 REM The strings to hold numeric data are initialized
  with spaces and the data RSET to the string to help ensure
  proper number and decimal placement for proper sorting
59106 A$=SPACE$(5): B$=SPACE$(8): C$=SPACE$(17)
59108 RSET A$=STR$(CVI(IN$)): RSET B$=STR$(CVS(SI$)):
  RSET C$=STR$(CVD(DP$))
59110 REM Allow 2 decimal places for numbers in B$
59112 SZ%=INSTR(1,B$,"."): REM Find location of decimal
59114 IF SZ%=0 THEN B$=RIGHT$(B$,5)+".00"
59116 IF SZ%>6 THEN B$=B$+"0": B$=RIGHT$(B$,8)
59118 IF ((SZ%<6) AND (SZ%>0)) THEN B$=LEFT$(B$,SZ%+2):
  B$=SPACE$(8-LEN(B$))+B$
59120 REM Allow 5 decimal places for numbers in C$
59122 SZ%=INSTR(1,C$,".")
59124 IF SZ%=0 THEN C$=RIGHT$(C$,11)+".00000"
59126 IF ((SZ%<12) AND (SZ%>0)) THEN C$=LEFT$(C$,SZ%+5):
  C$=SPACE$(17-LEN(C$))+C$
59128 IF SZ%>12 THEN C$=C$+STRING$(5-(17-SZ%),"0"):
  C$=RIGHT$(C$,17)
59130 ON SORTBY% GOTO 59132,59134,59136,59138
59132 SSORT$(1)=ST$+A$+B$+C$: GOTO 59140
59134 SSORT$(1)=A$+B$+C$+ST$: GOTO 59140
59136 SSORT$(1)=B$+C$+ST$+A$: GOTO 59140
59138 SSORT$(1)=C$+ST$+A$+B$
59140 RETURN
59500 REM >> Open & field SSORT.$$$ for writing sorted file <<
59502 REM This file to be fielded like the file being sorted
59504 OPEN "R", #2, "SSORT.$$$",RL%: REM RL% = Record length
59506 FIELD #2,1 AS R2$,10 AS S1$,2 AS I2$,4 AS S2$,8 AS D2$
59508 RETURN
59600 REM >>>>> Write data from buffer #1 to #2 <<<<<
59602 LSET R2$=RS$: LSET S1$=ST$: LSET I2$=IN$: LSET S2$=SI$:
  LSET D2$=DP$
59604 RETURN
59900 REM    XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
60000 REM >>>>> Open & field file to be sorted <<<<<
60002 REM Host program sets value for WHICHFILE% to determine
  which file will be sorted.  At the same time the host program
  gives the record length for this file to the variable RL%
60004 ON WHICHFILE% GOTO 60006,60010,60014
60006 OPEN "R", #1, "FILE-1.DAT",RL%
60008 FIELD #1, 1 AS RS$, 5 AS ST$, 2 AS IN$, 4 AS SI$,
  8 AS DP$:GOTO 60018
60010 OPEN "R", #1, "FILE-2.DAT",RL%
60012 FIELD #1, 1 AS RS$, 10 AS ST$, 2 AS IN$, 4 AS SI$,
  8 AS DP$:GOTO 60018
60014 OPEN "R", #1, "FILE-3.DAT",RL%
60016 FIELD #1,1 AS RS$,2 AS IN$,8 AS DP$,4 AS SI$,20 AS ST$
60018 SFILELEN%=LOF(1)\RL%: REM If LOF does not return length
  of file in BYTES then calculation must be modified
60020 IF SFILELEN%>0 THEN GET #1, SFILELEN% ELSE GOTO 60024
60022 IF RS$<>"A" THEN SFILELEN%=SFILELEN%-1: GOTO 60020
60024 RETURN
60100 REM >>>>> Construct SSORT$(1) from sort key data <<<<<
60102 ON WHICHFILE% GOTO 60104,60106,60114
60104 SSORT$(1)=ST$:GOTO 60124
60106 A$=SPACE$(5): RSET A$=STR$(CVI(IN$))
60108 REM This sort key to sort the string ST$ in ascending
  order and the integer IN$ in descending order at same time
60110 FOR SZ%=1 TO 5: MID$(A$,SZ%,1)=CHR$(255-ASC(MID$
  (A$,SZ%,1))): NEXT SZ%
60112 SSORT$(1)=ST$+A$:GOTO 60124
60114 REM the string data is all converted to upper case
60116 A$=ST$: FOR SZ%=1 TO LEN(A$)
60118 IF ((ASC(MID$(A$,SZ%,1))>96) AND (ASC(MID$(A$,SZ%,1))
  <123)) THEN MID$(A$,SZ%,1)=CHR$((ASC(MID$(A$,SZ%,1)))-32)
60120 NEXT SZ%
60122 SSORT$(1)=A$
60124 RETURN
60500 REM >> Open & field SSORT.$$$ for writing sorted file <<
60502 OPEN "R", #2, "SSORT.$$$",RL%: REM RL%=Record length
60504 ON WHICHFILE% GOTO 60506,60508,60510
60506 FIELD #2, 1 AS R1$, 5 AS S1$, 2 AS I1$, 4 AS S2$,
  8 AS D1$:GOTO 60512
60508 FIELD #2, 1 AS R1$, 10 AS S1$, 2 AS I1$, 4 AS S2$,
  8 AS D1$:GOTO 60512
60510 FIELD #2,1 AS R1$,2 AS I1$,8 AS D1$,4 AS S2$,20 AS S1$
60512 RETURN
60600 REM >>>>> Write data from buffer #1 to #2 <<<<<
60602 ON WHICHFILE% GOTO 60606,60606,60608
60604 REM Since the first 2 files use the same field names
  one series of LSET statements will work for either
60606 LSET R1$=RS$: LSET S1$=ST$: LSET I1$=IN$: LSET S2$=SI$:
  LSET D1$=DP$: GOTO 60610
60608 LSET R1$=RS$: LSET I1$=IN$: LSET D1$=DP$: LSET S2$=SI$:
  LSET S1$=ST$
60610 RETURN
60900 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
61000 REM >>>>> Open & field file to be sorted <<<<<
61010 RL%=25: OPEN "R", #1,"TEST.ASC",RL%
61020 FIELD #1, 1 AS RECSTATUS$, 10 AS CHARSTR$, 2 AS INTGR$,
  4 AS SINGPREC$, 8 AS DOUBPREC$
61030 SFILELEN%=LOF(1)\RL%
61040 IF SFILELEN%>0 THEN GET #1,SFILELEN% ELSE GOTO 61060
61050 IF RECSTATUS$<>"A" THEN SFILELEN%=SFILELEN%-1:GOTO 61040
61060 RETURN
61100 REM >>>>> Construct SSORT$(1) from sort key data <<<<<
61110 SSORT$(1)=CHARSTR$
61120 RETURN
61500 REM >> Open & field SSORT.$$$ for writing sorted file <<
61510 OPEN "R",#2,"SSORT.$$$",RL%
61520 FIELD #2,1 AS RS$,10 AS CR$,2 AS IT$,4 AS SP$,8 AS DP$
61530 RETURN
61600 REM >>>>> Write data from buffer #1 to #2 <<<<<
61610 LSET RS$=RECSTATUS$: LSET CR$=CHARSTR$: LSET IT$=INTGR$:
  LSET SP$=SINGPREC$: LSET DP$=DOUBPREC$
61620 RETURN
62000 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
62002 REM X                    VARIABLES                                  X
62004 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
62006 REM X     SASection = Array showing the record                       X
62008 REM X        numbers where sort sects. begin and end                X
62010 REM X     SBytes = LENgth of sort string                            X
62012 REM X     SComp = Array(2) of record numbers being                  X
62014 REM X        compared for sorting                                   X
62016 REM X     SDividerLoc = Location of present sort                    X
62018 REM X        divider (-1=SLeft;1=SRight) in SComp                   X
62020 REM X     SEction = Pointer to the sect. to be sorted               X
62022 REM X     SFileLen = Number of recs in file to sort                 X
62024 REM X     SGetData = Data string from file to sort                  X
62026 REM X     SLeft = Left side of segment being sorted                 X
62028 REM X     SMidPoint = Mid point of sect. being sorted               X
62030 REM X     SNewOrder = Array w/ sorted order of rec #s               X
62032 REM X     Sorted = Number of records currently sorted               X
62034 REM X     SProcedure = Fwd sort SP=1; Rev sort SP=0                 X
62036 REM X     SRight = Right side of segment bejng sorted               X
62038 REM X     SSort = Array(2) of string data to be sorted              X
62040 REM X     SUnused = Free memory available                           X
62042 REM X     SX = Loop counter                                         X
62044 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
62046 REM
62048 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
62050 REM X                  PREREQUISITES                                X
62052 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
62054 REM X  SBytes% must be set to the length of the sort$               X
62056 REM X    before entering this subroutine                            X
62058 REM X  SFileLen% must be set to the # of recs in the                X
62060 REM X    file to be sorted before entering this subr.               X
62062 REM X  ERASE SComp%, SNewOrder%, SSort$, SASection%                 X
62064 REM X    after returning from this subroutine                       X
62066 REM X  SProcedure% must be set to =1 for forward sort               X
62068 REM X    or =0 for reverse sort before entering subr.               X
62070 REM X  A subroutine must be at line 61000 to open and               X
```

Program continued on page 112



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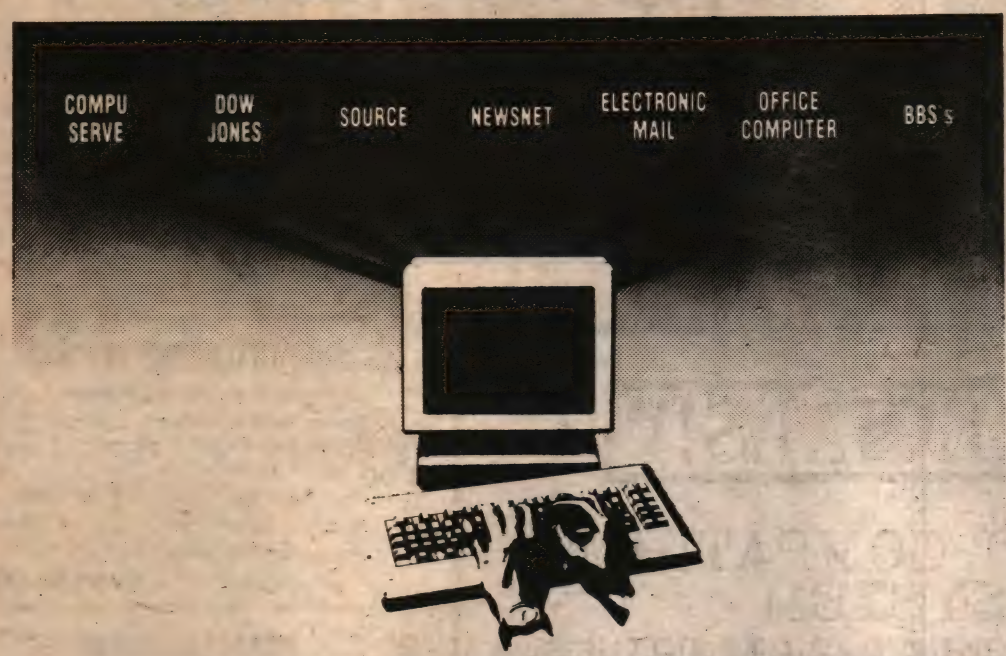
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sort string must have already been calculated within the host program and given to the sort module as a value in the range of 1-255 for the variable SBYTES%. The combined length of all sort keys must not exceed 255 bytes as this is the maximum string length and cannot be exceeded by SSORT$(1).

INTEGER CONVERSION FOR USE AS A SORTING KEY: In line 59106 of the example A$ is initialized to five spaces. In line 59108 the integer field from the file to be sorted is RSET into A$ to ensure a proper sort. A$ was initialized at five spaces as no unsigned integer can be any longer than five numeric characters (this example assumes there are no negative numbers) and using RSET to place the number in the string assures that all numeric positions for any numbers encountered will line up properly. If this were not done and the following numbers were encountered, they would be sorted in the following order: 1, 11, 2, 22, 3, 33, 34, 4, etc. Another method of converting an integer which has been stored with the MKI$ function to a sortable string (of only two bytes!) is to first use CVI to convert it back to a normal integer and then use a function (user defined) to convert it to the 2 byte string. This can be quite handy if a lot of data is

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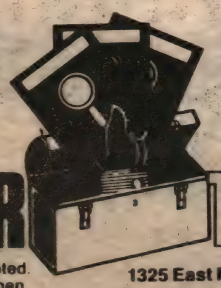
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Program

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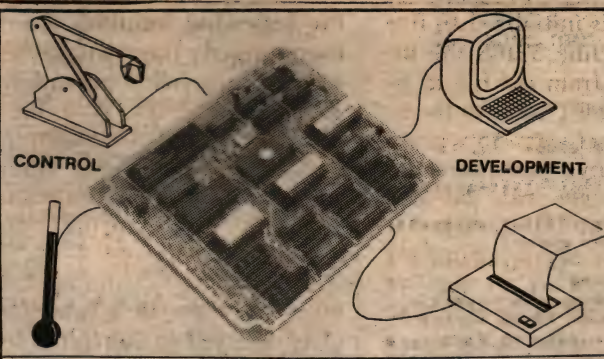
```
62072 REM X    field the file to be sorted using buffer #1    X
62074 REM X  A subroutine must be at line 61100 to obtain     X
62076 REM X    the data items being used as sort keys and     X
62078 REM X    concatenate them into SSort$(1)                X
62080 REM X  A subroutine must be at line 61500 to open and   X
62082 REM X    field "SSORT.$$$" using buffer #2.  File must  X
62084 REM X    be fielded to accept records from file which   X
62086 REM X    is being sorted                                X
62088 REM X  A subroutine must be at line 61600 to LSET the   X
62090 REM X    data read from the file to be sorted into the  X
62092 REM X    buffer #2 for "SSORT.$$$" which will contain   X
62094 REM X    the properly sorted records                    X
62096 REM X  The newly sorted file will be "SSORT.$$$" as     X
62098 REM X    the subroutine returns to the main program.    X
62100 REM X    The file which was sorted remains intact and   X
62102 REM X    still retains its original file name.          X
62104 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
62106 REM
62108 REM >>>>> Beginning of subroutine <<<<<
62110 CLS: SORTED%=0: LOCATE 12,34: PRINT "SORT ROUTINE":
  PRINT: REM For some BASICs LOCATE positions must be reversed
62112 IF ((SBYTES%<1) OR (SBYTES%>255)) THEN PRINT "ERROR: The
  number of bytes in the sort string is out of range.":
  FOR SX%=1 TO 3000: NEXT SX%: GOTO 62138
62114 IF SPROCEDURE%=1 THEN PRINT "Normal sort:" ELSE
  IF SPROCEDURE%=0 THEN PRINT "Reverse sort:" ELSE PRINT
  "ERROR: Sort Procedure variable not properly set. ":
  FOR SX%=1 TO 3000: NEXT SX%: GOTO 62138
62116 SUNUSED!=FRE(2): IF SUNUSED!<(4707+(4.4*SFILELEN%)) THEN
  PRINT "PROBLEM: Apparently not enough free memory for
  variables used during sort": FOR SX%=1 TO 3000: NEXT SX%:
  GOTO 62138
62118 IF ((SFILELEN%>32767) OR (SFILELEN%<3)) THEN PRINT
  "ERROR: FILE CANNOT BE SORTED. EITHER TOO MANY (32,767+) OR
  TOO FEW (-3) RECORDS":FOR SX%=1 TO 3000:NEXT SX%:GOTO 62138
62120 OPTION BASE 1: DIM SCOMP%(2): DIM SNEWORDER%(SFILELEN%):
  DIM SSORT$(2): DIM SASECTION%(2,INT(.6*SFILELEN%))
62122 PRINT "Reading data to be sorted:"
62124 CLOSE: GOSUB 62142
62126 PRINT "Sorting records: ";
62128 CLOSE: GOSUB 62180: GOSUB 62188: PRINT
62130 CLOSE: KILL "SSORT.$$$"
62132 PRINT "Writing sorted data to 'SSORT.$$$' file:"
62134 GOSUB 62162: REM Write sorted file
62136 CLOSE
62138 RETURN: REM End of subroutine
62140 REM >>>>> End of subroutine <<<<<
62142 REM >>>>> Read file to be sorted, write sort fields
  to SSORT.$$$ <<<<<
62144 GOSUB 61000:REM Open & field file to sort in buffer #1
62146 GOSUB 62180: REM Open & field SSORT.$$$
62148 FOR SX%=1 TO SFILELEN%
62150 GET #1,SX%
62152 GOSUB 61100: REM Extract data fields to be sorted and
  concatenate to SSORT$(1)
62154 LSET SGETDATA$=SSORT$(1)
62156 PUT #2,SX%
62158 NEXT SX%
62160 RETURN
62162 REM >>>>> Write sorted file to SSORT.$$$ <<<<<
62164 GOSUB 61000:REM Open and field file to sort to buffer #1
62166 GOSUB 61500:REM Open and field "SSORT.$$$" to buffer #2
62168 FOR SX%=1 TO SFILELEN%
62170 GET #1,SNEWORDER%(SX%):REM Read data from file to sort
62172 GOSUB 61600: REM Put data read to buffer #2
62174 PUT #2, SX%: REM Write sorted data to "SSORT.$$$" file
62176 NEXT SX%
62178 RETURN
62180 REM >>> Open and field SSORT.$$$ to hold sort data <<<
62182 CLOSE #2: OPEN "R", #2, "SSORT.$$$",SBYTES%
62184 FIELD #2, SBYTES% AS SGETDATA$
62186 RETURN
62188 REM >>>>> SORT ROUTINE <<<<<
62190 FOR SX%=1 TO SFILELEN%: SNEWORDER%(SX%)=SX%: NEXT SX%
62192 SLEFT%=1: SRIGHT%=SFILELEN%: SECTION%=0
62194 SORTED%=SORTED%+1: PRINT USING "#####";SORTED%;: LOCATE
  CSRLIN,POS(2)-5: SCOMP%(1)=SLEFT%: SCOMP%(2)=SRIGHT%:
  SDIVIDERLOC%=-1: REM For some BASICs the positions at the
  LOCATE stmt. may need to be reversed and the '(2)' deleted
62196 IF SCOMP%(1)=SCOMP%(2) THEN GOTO 62212
62198 FOR SX%=1 TO 2: GET #2,SNEWORDER%(SCOMP%(SX%)):
  SSORT$(SX%)=SGETDATA$: NEXT SX%
62200 IF SPROCEDURE%=0 THEN GOTO 62204: REM If 0 reverse sort
62202 IF SSORT$(1)<=SSORT$(2) THEN GOTO 62208 ELSE GOTO 62206
62204 IF SSORT$(1)>=SSORT$(2) THEN GOTO 62208
62206 SWAP SNEWORDER%(SCOMP%(1)), SNEWORDER%(SCOMP%(2)):
  SDIVIDERLOC%=-SDIVIDERLOC%
62208 IF SDIVIDERLOC%=-1 THEN SCOMP%(2)=SCOMP%(2)-1:GOTO 62196
62210 SCOMP%(1)=SCOMP%(1)+1: GOTO 62196
62212 SMIDPOINT%=SCOMP%(1)
62214 IF SMIDPOINT%+1>=SRIGHT% THEN GOTO 62218
62216 SECTION%=SECTION%+1: SASECTION%(1,SECTION%)=SMIDPOINT%+1:
  SASECTION%(2,SECTION%)=SRIGHT%
62218 SRIGHT%=SMIDPOINT%-1:
62220 IF SRIGHT%<=SLEFT% THEN GOTO 62224
62222 GOTO 62194
62224 IF SECTION%=0 THEN GOTO 62230: REM Sort is complete
62226 SLEFT%=SASECTION%(1,SECTION%): SRIGHT%=SASECTION%
  (2,SECTION%): SECTION%=SECTION%-1
62228 GOTO 62194
62230 RETURN
63000 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
63002 REM X                  VARIABLES                         X
63004 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
63006 REM X      S1SortKey = Sort key field in SSORT-1.$$$     X
63008 REM X      S2SortKey = Sort key field in SSORT-2.$$$     X
63010 REM X      S3RecNo = Record # associated w/ sort key     X
63012 REM X      S4RecNo = Record # associated w/ sort key     X
63014 REM X      SameSide = If record out of sequence change   X
63016 REM X        to other merge file using this variable     X
63018 REM X      SBytes = LENgth of sort string                X
63020 REM X      SCount = Array (2) # of recs. in merge files  X
63022 REM X      SFileLen = Number of recs in file to sort     X
63024 REM X      SGetData = Data string from file to sort      X
63026 REM X      SMergeRuns= Runs of records which are ordered X
63028 REM X      SNewOrder = Array w/ sorted order of rec #s   X
63030 REM X      Sorted = Number of completed sort cycles      X
63032 REM X      SProcedure = Fwd sort SP=1; Rev sort SP=0     X
63034 REM X      SRecno = Record number associated w/ sort key X
63036 REM X      SSort = Array(2) of string data to be sorted  X
63038 REM X      SUnused = Free memory available               X
63040 REM X      SX = Loop counter                             X
63042 REM X      SZ = Loop counter                             X
63044 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

Program continued on page 113

Universal Sorting Program continued from page 112

```
63046 REM
63048 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
63050 REM X                    PREREQUISITES                            X
63052 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
63054 REM X  SBytes% must be set to the length of the sort$  X
63056 REM X    before entering this subroutine               X
63058 REM X  SFileLen% must be set to the # of recs in the   X
63060 REM X    file to be sorted before entering this subr.  X
63062 REM X  ERASE SCount%, SNewOrder%, SSort$               X
63064 REM X    after returning from this subroutine          X
63066 REM X  SProcedure% must be set to =1 for forward sort  X
63068 REM X    or =0 for reverse sort before entering subr.  X
63070 REM X  A subroutine must be at line 61000 to open and  X
63072 REM X    field the file to be sorted using buffer #1   X
63074 REM X  A subroutine must be at line 61100 to obtain    X
63076 REM X    the data items being used as sort keys and    X
63078 REM X    concatenate them into SSort$(1)               X
63080 REM X  A subroutine must be at line 61500 to open and  X
63082 REM X    field "SSORT.$$$" using buffer #2.  File must X
63084 REM X    be fielded to accept records from file which  X
63086 REM X    is being sorted                               X
63088 REM X  A subroutine must be at line 61600 to LSET the  X
63090 REM X    data read from the file to be sorted into the X
63092 REM X    buffer #2 for "SSORT.$$$" which will contain  X
63094 REM X    the properly sorted records                   X
63096 REM X  The newly sorted file will be "SSORT.$$$" as    X
63098 REM X    the subroutine returns to the main program.   X
63100 REM X    The file which was sorted remains intact and  X
63102 REM X    still retains its original file name.         X
63104 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
63106 REM >>>>> Beginning of subroutine <<<<<
63108 CLS: LOCATE 12,34: PRINT "MERGE  SORT": PRINT: REM For
  some BASICs the LOCATE positions must be reversed
63110 IF ((SBYTES%<1) OR (SBYTES%>255)) THEN PRINT "ERROR: An
  improper value is set for the sort key string length
  (SBYTES%)": FOR SX%=1 TO 3000: NEXT SX%: GOTO 63140
63112 IF SPROCEDURE%=1 THEN PRINT "Ascending sort:" ELSE IF
  SPROCEDURE%=0 THEN PRINT "Descending sort:" ELSE PRINT"ERROR:
  SPROCEDURE% has incorrect value.":FOR SX%=1 TO 3000:NEXT SX%:
  GOTO 63140
63114 IF ((SFILELEN%<3) OR (SFILELEN%>32767)) THEN PRINT
  "ERROR: Too few (<3) or too many (>32767) records in file
  for sorting":FOR SX%=1 TO 3000: NEXT SX%: GOTO 63140
63116 SUNUSED!=FRE(Z): IF SUNUSED!<(4600+(2*SFILELEN%)) THEN
  PRINT "PROBLEM: Apparently insufficient free memory for
  variables used during sort": FOR SX%=1 TO 3000: NEXT SX%:
  GOTO 63140
63118 OPTION BASE 1: DIM SCOUNT%(2): DIM SSORT$(2):
  DIM SNEWORDER%(SFILELEN%)
63120 PRINT "Reading data to be sorted:"
63122 CLOSE: GOSUB 63144:
63124 PRINT "SORTING:":PRINT "Merge sort runs completed:    ";
63126 CLOSE: GOSUB 63182: REM Do sort
63128 PRINT "Writing sorted file:"
63130 GOSUB 61000: GOSUB 61500:
63132 FOR SX%=1 TO SFILELEN%
63134 GET #1,SNEWORDER%(SX%): GOSUB 61600: PUT #2
63136 NEXT SX%
63138 CLOSE
63140 RETURN
63142 REM >>>>> End of subroutine <<<<<
63144 REM Read file to be sorted, write sort keys to SSORT.$$$
63146 GOSUB 61000: REM Open & field file to be sorted
63148 GOSUB 63162: REM Open & field SSORT.$$$ file
63150 FOR SX%=1 TO SFILELEN%
63152 GET #1, SX%
63154 GOSUB 61100: REM Get keys and construct sort key string
63156 LSET SRECNO$=MKI$(SX%): LSET SGETDATA$=SSORT$(1):
  PUT #2,SX%
63158 NEXT SX%
63160 RETURN
63162 REM >>>>> Open & field SSORT.$$$ file <<<<<
63164 OPEN "R",#2,"SSORT.$$$",SBYTES%+2
63166 FIELD #2, 2 AS SRECNO$, SBYTES% AS SGETDATA$
63168 RETURN
63170 REM >>>>> Open & field merge files <<<<<
63172 OPEN "R",#1,"SSORT-1.$$$", SBYTES%+2
63174 FIELD #1, 2 AS S3RECNO$, SBYTES% AS S1SORTKEY$
63176 OPEN "R", #3, "SSORT-2.$$$", SBYTES%+2
63178 FIELD #3, 2 AS S4RECNO$, SBYTES% AS S2SORTKEY$
63180 RETURN
63182 REM >>>>> SORT ROUTINE <<<<<
63184 SMERGERUNS%=0: SORTED%=0
63186 GOSUB 63170: REM Open & field merge files
63188 GOSUB 63162: REM Open & field SSORT.$$$
63190 GET #2,1: SSORT$(1)=SGETDATA$: LSET S3RECNO$=SRECNO$:
  LSET S1SORTKEY$=SGETDATA$: PUT #1: SAMESIDE%=1: SCOUNT%(1)=1:
  SCOUNT%(2)=0
63192 FOR SX%=2 TO SFILELEN%
63194 GET #2,SX%: SSORT$(2)=SGETDATA$
63196 IF SPROCEDURE%=0 THEN IF SSORT$(2)>SSORT$(1) THEN
  SAMESIDE%=-SAMESIDE%: SMERGERUNS%=SMERGERUNS%+1
63198 IF SPROCEDURE%=1 THEN IF SSORT$(2)<SSORT$(1) THEN
  SAMESIDE%=-SAMESIDE%: SMERGERUNS%=SMERGERUNS%+1
63200 IF SAMESIDE%>0 THEN LSET S3RECNO$=SRECNO$:
  LSET S1SORTKEY$=SGETDATA$: PUT #1: SCOUNT%(1)=SCOUNT%(1)+1
63202 IF SAMESIDE%<0 THEN LSET S4RECNO$=SRECNO$:
  LSET S2SORTKEY$=SGETDATA$: PUT #3: SCOUNT%(2)=SCOUNT%(2)+1
63204 SSORT$(1)=SSORT$(2): NEXT SX%: CLOSE
63206 GOSUB 63170: GOSUB 63162
63208 IF SMERGERUNS%<1 THEN GOTO 63232: REM File is sorted
63210 SORTED%=SORTED%+1: LOCATE CSRLIN,POS(2)-5:
  PRINT USING "######";SORTED%;
63212 SX%=1: SZ%=1
63214 GET #1,SX%: GET #3,SZ%
63216 IF SPROCEDURE%=0 THEN GOTO 63222
63218 IF S1SORTKEY$<S2SORTKEY$ THEN SX%=SX%+1: LSET SRECNO$=
  S3RECNO$: LSET SGETDATA$=S1SORTKEY$: PUT #2: GOTO 63224
63219 SZ%=SZ%+1: LSET SRECNO$=S4RECNO$: LSET SGETDATA$=
  S2SORTKEY$: PUT #2: GOTO 63224
63222 IF S1SORTKEY$>S2SORTKEY$ THEN SX%=SX%+1: LSET SRECNO$=
  S3RECNO$: LSET SGETDATA$=S1SORTKEY$: PUT #2: GOTO 63224
63223 SZ%=SZ%+1: LSET SRECNO$=S4RECNO$:
  LSET SGETDATA$=S2SORTKEY$: PUT #2
63224 IF ((SX%<=SCOUNT%(1)) AND (SZ%<=SCOUNT%(2)))
  THEN GOTO 63214
63226 IF SX%<=SCOUNT%(1) THEN GET #1,SX%: SX%=SX%+1: LSET
  SRECNO$=S3RECNO$:LSET SGETDATA$=S1SORTKEY$:PUT #2:GOTO 63226
63228 IF SZ%<=SCOUNT%(2) THEN GET #3,SZ%: SZ%=SZ%+1: LSET
  SRECNO$=S4RECNO$:LSET SGETDATA$=S2SORTKEY$:PUT #2:GOTO 63228
63230 CLOSE: SMERGERUNS%=0: GOTO 63186
63232 REM >>> Get file #s from sorted file & put to array <<<<
63234 PRINT "    Final merge": CLOSE: KILL "SSORT.$$$":
  GOSUB 63170:
```

Program continued on page 114



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Universal Sorting Program continued from page 113

```
63236 FOR SX%=1 TO SFILELEN%
63238 GET #1,SX%: SNEWORDER%(SX%)=CVI(93RECNO$);
63240 NEXT SX%
63242 CLOSE: KILL "SSORT-1.$$$": KILL "SSORT-2.$$$"
63244 RETURN
64000 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
64002 REM X                    VARIABLES                                  X
64004 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
64006 REM X     SASection = Array showing the record                       X
64008 REM X       numbers where sort sects. begin and end                 X
64010 REM X     SBytes = LENgth of sort string                            X
64012 REM X     SComp = Array of rec #s in memory for sort                 X
64014 REM X     SEctors = Pointer to the sect. to be sorted               X
64016 REM X     SFileLen = Number of recs in file to sort                 X
64018 REM X     SGetData = Data string from file to sort                  X
64020 REM X     SLowest = Record # and sork key being                     X
64022 REM X       compared in memory to find lowest record                X
64024 REM X     SNewOrder = Array w/ sorted order of rec #s               X
64026 REM X     SProcedure = Fwd sort SP=1; Rev sort SP=0                 X
64028 REM X     SSort = Array of string data to be sorted                 X
64030 REM X     STrack = Count of records already sorted                  X
64032 REM X     SUnused = Free memory available                           X
64034 REM X     SX = Loop counter                                         X
64036 REM X     SZ = Loop counter                                         X
64038 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
64040 REM
64042 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
64044 REM X                    PREREQUISITES                              X
64046 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
64048 REM X  SBytes% must be set to the length of the sort$               X
64050 REM X    before entering this subroutine                           X
64052 REM X  SFileLen% must be set to the # of recs in the               X
64054 REM X    file to be sorted before entering this subr.              X
64056 REM X  ERASE SComp%, SNewOrder%, SSort$, SASection%                X
64058 REM X    after returning from this subroutine                      X
64060 REM X  SProcedure% must be set to =1 for forward sort              X
64062 REM X    or =0 for reverse sort before entering subr.              X
64064 REM X  A subroutine must be at line 61000 to open and              X
64066 REM X    field the file to be sorted using buffer #1               X
64068 REM X  A subroutine must be at line 61100 to obtain                X
64070 REM X    the data items being used as sort keys and                X
64072 REM X    concatenate them into SSort$(1)                           X
64074 REM X  A subroutine must be at line 61500 to open and              X
64076 REM X    field "SSORT.$$$" using buffer #2.  File must             X
64078 REM X    be fielded to accept records from file which              X
64080 REM X    is being sorted                                           X
64082 REM X  A subroutine must be at line 61600 to LSET the              X
64084 REM X    data read from the file to be sorted into the             X
64086 REM X    buffer #2 for "SSORT.$$$" which will contain              X
64088 REM X    the properly sorted records                               X
64090 REM X  The newly sorted file will be "SSORT.$$$" as                X
64092 REM X    the subroutine returns to the main program.               X
64094 REM X    The file which was sorted remains intact and              X
64096 REM X    still retains its original file name.                     X
64098 REM XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
64100 REM
64102 REM >>>>> Beginning of subroutine <<<<<
64104 CLS: LOCATE 12,34: PRINT "SORT ROUTINE": PRINT: REM For
  some BASICs the LOCATE positions must be reversed
64106 IF ((SBYTES%<1) OR (SBYTES%>255)) THEN PRINT "ERROR: The
  number of bytes in the sort string is out of range.": FOR
  SX%=1 TO 3000: NEXT SX%: GOTO 62138
64108 IF SPROCEDURE%=1 THEN PRINT "Normal sort:" ELSE IF
  SPROCEDURE%=0 THEN PRINT "Reverse sort:" ELSE PRINT "ERROR:
  Sort Procedure variable not properly set. ": FOR SX%=1
  TO 3000: NEXT SX%: GOTO 62138
64110 SUNUSED!=FRE(Z): IF SUNUSED!<(3118+(SFILELEN%*2)) THEN
  PRINT "PROBLEM: Apparently not enough free memory for
  variables used during sort": FOR SX%=1 TO 3000: NEXT SX%:
  GOTO 62138
64112 IF ((SFILELEN%>32767) OR (SFILELEN%<3)) THEN PRINT
  "ERROR: FILE CANNOT BE SORTED. EITHER TOO MANY (32,767+) OR
  TOO FEW (-3) RECORDS":FOR SX%=1 TO 3000:NEXT SX%:GOTO 62138
64116 SECTORS%=INT(.7*(FRE(Z)/SBYTES%))-1: IF SECTORS%>
  SFILELEN% THEN SECTORS%=SFILELEN%
64118 DIM SASECTION%(SECTORS%): DIM SSORT$(SECTORS%):
  DIM SCOMP%(SECTORS%): DIM SNEWORDER%(SFILELEN%)
64120 FOR SX%=1 TO SECTORS%
64122 SASECTION%(SX%)=SX%*(SFILELEN%\SECTORS%): NEXT SX%
64124 SASECTION%(0)=0: SASECTION%(SECTORS%)=SFILELEN%
64126 FOR SX%=1 TO SFILELEN%: SNEWORDER%(SX%)=SX%: NEXT SX%
64128 PRINT "Reading data to be sorted:"
64130 CLOSE: GOSUB 64200
64132 PRINT "Sorting records:": PRINT "  Records to sort:  ";
  SFILELEN%: PRINT "  Records sorted:      "
64134 CLOSE: GOSUB 64200: GOSUB 64144
64136 PRINT "Writing sorted data SSORT.$$$ file:"
64138 CLOSE: KILL "SSORT.$$$": GOSUB 64222
64140 CLOSE: RETURN
64142 REM >>>>> End of subroutine <<<<<
64144 REM >>>>> Sort Routine <<<<<<
64146 STRACK%=1: FOR SX%=1 TO SECTORS%: SSORT$(SX%)="":
  SCOMP%(SX%)=0: NEXT SX%
64148 REM >>>>> Initialize memory sorting <<<<<
64150 FOR SX%=1 TO SECTORS%: GOSUB 64182: NEXT SX%
64152 REM >>>>> Do sort <<<<<
64154 FOR SX%=1 TO SECTORS%
64156 IF SCOMP%(SX%)>0 THEN SLOWEST$=SSORT$(SX%):SLOWEST%=SX%:
  SX%=SECTORS%+1
64158 NEXT SX%
64160 IF SLOWEST%=0 THEN GOTO 64180: REM Sort completed
64162 FOR SX%=SLOWEST% TO SECTORS%
64164 IF SPROCEDURE%=1 THEN GOTO 64170
64166 IF SSORT$(SX%)>SLOWEST$ THEN SLOWEST$=SSORT$(SX%):
  SLOWEST%=SX%
64168 GOTO 64172
64170 IF SCOMP%(SX%)>0 THEN IF SSORT$(SX%)<SLOWEST$ THEN
  SLOWEST$=SSORT$(SX%): SLOWEST%=SX%
64172 NEXT SX%
64174 SNEWORDER%(SCOMP%(SLOWEST%))=-STRACK%: STRACK%=STRACK%+1
64176 LOCATE CSRLIN,POS(2)-5: PRINT USING "#####"; STRACK%-1;
64178 SSORT$(SLOWEST%)="": SCOMP%(SLOWEST%)=0: SX%=SLOWEST%:
  SLOWEST$="": SLOWEST%=0: GOSUB 64182: GOTO 64152
64180 PRINT ">Completed<": RETURN
64182 REM >>>>> Find lowest record in sector <<<<<
64184 FOR SZ%=SASECTION%(SX%-1)+1 TO SASECTION%(SX%)
64186 IF SNEWORDER%(SZ%)>0 THEN GET #2,SZ% ELSE GOTO 64198
64188 IF SSORT$(SX%)="" THEN SSORT$(SX%)=SGETDATA$:
  SCOMP%(SX%)=SZ%
64190 IF SPROCEDURE%=1 THEN GOTO 64196
64192 IF SGETDATA$>SSORT$(SX%) THEN SSORT$(SX%)=SGETDATA$:
  SCOMP%(SX%)=SZ%
64194 GOTO 64198
64196 IF SGETDATA$<SSORT$(SX%) THEN SSORT$(SX%)=SGETDATA$:
  SCOMP%(SX%)=SZ%
64198 NEXT SZ%: SNEWORDER%(SCOMP%(SX%))=0: RETURN
64200 REM >>>>> Open & field SSORT.$$$ <<<<<
64202 OPEN "R", #2, "SSORT.$$$", SBYTES%
64204 FIELD #2, SBYTES% AS SGETDATA$
64206 RETURN
64208 REM Read file to be sorted, write sort key to SSORT.$$$
64210 GOSUB 61000: REM Open & field file to sort
64212 GOSUB 64200: REM Open & field SSORT.$$$
64214 FOR SX%=1 TO SFILELEN%
64216 GET#1,SX%: GOSUB 61100
64218 LSET SGETDATA$=SSORT$(1): PUT #2,SX%
64220 NEXT SX%: CLOSE: RETURN
64222 REM >>>>> Write sorted file to SSORT.$$$ <<<<<
64224 GOSUB 61000: GOSUB 61500
64226 FOR SX%=1 TO SFILELEN%
64228 GET #1, SX%
64230 GOSUB 61600: PUT #2,ABS(SNEWORDER%(SX%))
64232 NEXT SX%: RETURN
```

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to be part of the sort key string and it is necessary to conserve as much space (bytes) as possible in the sort key string. The function which will make the conversion is: DEF FNX$(X%) = RIGHT$(MKI$(-SGN(X%)*(32768-ABS(X%))),1) + LEFT$(MKI$(-SGN(X%)*32768-ABS(X%))),1).

SINGLE AND DOUBLE PRECISION NUMBER CONVERSION FOR USE AS A SORTING KEY: Single and double precision numbers, particularly when decimal points are involved, can become a great deal more confused than integers if not properly set within a string for sorting. For the purposes of illustration, single precision numbers were allowed five decimal places and double precision numbers were allowed five decimal places in the programming. Anything beyond the second or fifth decimal places, respectively, would not be considered in the sort. Line 59106 initializes B$ to eight spaces for single precision numbers (seven significant numbers plus a decimal point) and C$ to 17 spaces for double precision numbers. In line 59108 the values are RSET into the appropriate strings. Lines 59112 and 59122 use the INSTR function to determine the position of a decimal point, if there is one, in the string. If no decimal is present lines 59114 and 59124 insert a decimal and trailing zeroes and correctly reformat the string. If a decimal is present but not in the correct position, it is repositioned by lines 59118 and 59126 and the extra decimal places present are truncated. Lines 59116 and 59128 add the necessary trailing zeroes if a decimal is present but lacks enough trailing decimal places.

Another method of handling the same situation is to have a user defined function to make a conversion of the single or double precision number to a sortable ASCII string. Using the following function, the first argument (n? - if the function is to be used with single precision numbers should be N! or with double precision numbers N#) is the number to be converted, the second (M%) is the multiplier and the third (L%) is the length of the string to be created. DEF FNX$(n?,M%,L%) = MID$("-0",(n?)0) + 2,1) + RIGHT$(STRING$(L%,"0") + MID$(STR$(INT(n?*M%)),2),L%). This function operates by beginning [MID$("0",] with a string of either "-0" if the number is negative [(n?(0) + 2,1)] or "0" if the number is zero or positive and adding to it [+ RIGHT$(] the right side of a string composed of a string of zeroes of the desired overall string length [STRING$(L%,"0")] followed by a string [+ MID$(STR$(INT(n?*M%)),2),L%)] representing the number to be converted times it multiplier.

DATE CONVERSION FOR USE AS A SORTING KEY: When dates are to be sorted they must appear within the sort as YEAR, MONTH, DATE to be ordered properly. If dates have been stored in the file as a three byte string with an ASCII character representing, respectively, MONTH, DAY and YEAR, then one need only move the last character (YEAR) to the first position in the string as preparation for sorting; if they are stored in a different format, the procedure may be somewhat more involved.

STRING CONVERSION FOR USE AS A SORTING KEY: In the subroutine at 59100 the string data is taken literally from the original file. If upper and lower case letters are present in this string they will be sorted as ASCII characters, not with the significance of the letters themselves (e.g. A B ... Y Z a b ... y z). In many instances this would be satisfactory; in others it would be necessary to convert the string to all upper (or lower) case letters for meaningful sort. In the example in lines 60116 - 60120 the string data has been taken from the file, loaded to A$ and then in these lines all lower case characters in A$ are converted to upper case.

SORTING ON MULTIPLE FIELDS: Files may be sorted on one or multiple fields. After the data from the file to be sorted is converted into a usable form in strings (as described above) the strings should be concatenated in order to sort importance into the actual string to be compared for sorting [SSORT$(1)] as in example lines 59132 - 59138.

DIFFERENT SORTING KEY COMBINATIONS: It may be desirable to sort a given file in several different ways for different purposes. The example subroutine at 59100 allows the file to be sorted in any of four different orders (lines 59132-59138). The variable used to determine sorting order (SORTBY%) would have previously been set within the host program. When this subroutine is encountered the sort key string is built according to the instruction in the appropriate line when the ON SORTBY% GOTO statement is encountered; following the building of the concatenated sort string another GOTO at the end of the line bypasses the other instructions and goes to the RETURN instruction. It is also possible that the various different sorting keys would have different string lengths (although in the example case they do not). In this case, it would be necessary to have a line or lines in the program identifying what value would be assigned to SBYTES% for each possible value of SORTBY%. SBYTES% must be set to the correct length for the sort key string which will ultimately be used.

SORTING TWO DIRECTIONS AT THE SAME TIME: There are times when it is convenient to have a file sorted two different directions at the same time; for example purposes, a string is to be sorted in ascending alphabetical order while an integer is to be sorted (as the secondary sort key) in descending order (e.g. to produce: AAA 10; AAA 8; AAA 4; BBB 7; BBB 3; etc.). This can be handled by the sort routine in two ways...the sort can be reverse (descending) and certain keys reversed to make them sort normally (ascending), or the file can be sorted normally with certain keys sorted reverse. In either case, the procedure is the same as regards building the sort key. For the example, line 60106 sets an integer into A$. Line 60110 reverses the order of A$ by replacing the actual character which belongs within the string with its compliment; this makes it sort in reverse order. The procedure is to take the ASCII character which belongs, subtract its ASCII value from 255, and replace it with the character whose value is the difference.

ABILITY TO SORT DIFFERENT FILES: In some more complex operations it may be desirable to have the ability within a single program to sort more than one file and file structure. If several files are

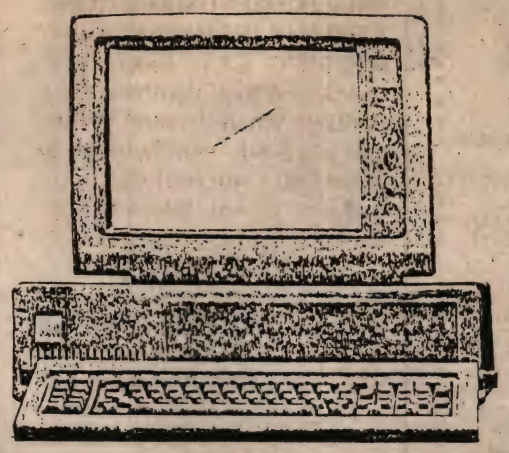
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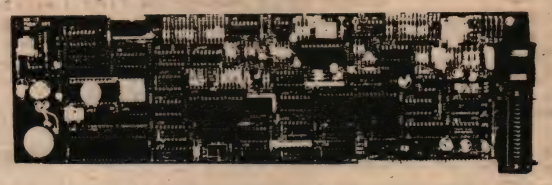
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Some Fine Points

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last unanswered call, etc. At some point a condition must change which allows the current call to be answered. For example 4! = 4x(3!) = 4x3x(2!) = 4x3x2x1. The last equality contains no factorials since 1! = 1. A recursive function to calculate 4! would first make a call with (4!) followed by (3!) followed by (2!) followed by (1!) but 1! = 1. Each unanswered call to a function remembers the part of the job it was to do before making another call. The last call results in a value of 1 since no factorials are present. The second to last unanswered call

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```
1   PROGRAM ENGINE_CONVERSION (INPUT,OUTPUT);

3   LABEL START,STOP;

5   VAR
6     MENUSELECT : CHAR;
7     CONVALUE : REAL;

9   FUNCTION CUIN_TO_LITER (CUIN: REAL) : REAL;
10    BEGIN
11      CUIN_TO_LITER := CUIN * 0.01638807;
12    END; { FUNCTION CUIN_TO_LITER }

14  FUNCTION LITER_TO_CUIN (LITER: REAL) : REAL;
15    BEGIN
16      LITER_TO_CUIN := LITER * 61.02;
17    END; { FUNCTION LITER_TO_CUIN }

19  BEGIN  {MAIN PROGRAM}

21  START: WRITELN;
22       WRITELN('            MENU');
23       WRITELN;
24       WRITELN('   ENGINE SIZE CONVERSION PROGRAM');
25       WRITELN('   ENTER YOUR SELECTION BELOW:');
26       WRITELN;
27       WRITELN('    CONVERT CUBIC INCHES TO LITERS ..... 1');
28       WRITELN('    CONVERT LITERS TO CUBIC INCHES ..... 2');
29       WRITELN('    END PROGRAM .....3');
30       WRITELN;
31       READLN(MENUSELECT);

33       CASE MENUSELECT OF
34         '1': BEGIN { CUBIC INCHES TO LITERS }
35                WRITE('ENTER THE NUMBER OF CUBIC INCHES TO BE CONVERTED');
36                WRITELN('TO LITERS:');
37                READLN(CONVALUE);
38                WRITELN;
39                WRITE(CONVALUE:4:1,' CUBIC INCHES= ');
40                WRITE(CUIN_TO_LITER(CONVALUE):4:1);
41                WRITELN(' LITERS');
42                WRITELN;
43              END; { CASE 1 }

45         '2': BEGIN { LITERS TO CUBIC INCHES }
46                WRITE('ENTER THE NUMBER OF LITERS TO BE CONVERTED TO ');
47                WRITELN('CUBIC INCHES');
48                READLN(CONVALUE);
49                WRITELN;
50                WRITE(CONVALUE:4:1,' LITERS = ');
51                WRITE(LITER_TO_CUIN(CONVALUE):4:1);
52                WRITELN(' CUBIC INCHES');
53                WRITELN;
54              END; { CASE 2 }

56         '3': GOTO STOP;

58              END; { CASE }
59              GOTO START;
60  STOP:    END.
```

Listing 1. Program to convert liters to cubic inches and vice versa using functions.

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Universal Sorting

continued from page 114

all structured alike (fielded the same) it is necessary only to use a variable file name as illustrated in the example in line 59002 where FILENAME$ is used. If several files which are structured differently are to be used, however, things begin to get a bit more complex. In this case a numeric variable might be used to identify the file which is to be sorted (e.g. WHICHFILE%) and either IF statements or ON GOTO statements used within the subroutines to direct the program to the proper areas for the specific file being sorted. Each subroutine would have to have the appropriate statements within it for each file which might be selected and a statement to activate that set of instructions. The example subroutines numbered 60000, 60100, 60500 and 60600 illustrate a set of subroutines allowing sorts on various different files which are all fielded somewhat differently.

TESTING THE SORTS: To facilitate the testing of the sort procedures and associated user written subroutines, a brief host program is included which creates dummy records in a file and calls the sort modules which perform the sort. The sorted file then may be read using the testing program to be certain that everything has worked properly. The test program is not designed to be extremely comprehensive; it serves only for demonstration purposes. It may be used with any of the example subroutines furnished by inserting lines in the 61000, 61100, 61500 and 61600 subroutines sending the programming to the appropriate lines in the 59000 set of examples or the 60000 set of examples (e.g. 61101 GOSUB 59100 and 61102 RETURN). In the above instance when the program asks the user which subroutine examples are to be used the user would enter "3," indicating the set in the 59000s. The user may also select a forward or reverse sort and may indicate which sort procedure module is to be tested. The test module will create the number of records desired by the user in a test file, perform the selected sort using the appropriate subroutines and then print the sorted file to screen for inspection.

For those users who may not wish to manually key in these modules, the author will make them available on 5.25", double sided, double density, floppy diskettes for a fee of $7.50 to cover the cost of the diskette, postage and handling. The programming will be supplied in ASCII as will documentation. Please specify PC/MS-DOS format (8 sectors per track) or your CP/M format. Although numerous CP/M formats are available, it is best to specify alternate formats which may be acceptable. This programming has been written in GW-BASIC and a few modifications can be expected to be necessary for CP/M computers, the most common of which are noted in the accompanying article. If you wish a copy of this programming on diskette please send your check or money order to: Frank Dutton, 8990 Richmond Avenue #1504, Houston, TX 77063. ●

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Corona Data Ships AT-Compatible, Transportable PC



Corona Data Systems, Inc. has begun shipments of an enhanced version of its Corona ATP transportable computer, the company announced.

The high-speed Corona system, which is IBM PC AT-compatible, was demonstrated for the first time at the COMDEX/Fall '85 trade show in Las Vegas, New., Nov. 20-24. Corona's booth number is 4116, located in the North Hall of the Las Vegas Convention Center.

The ATP is based on the Intel 80286 microprocessor and features a clock rate of 8 megahertz with no wait states.

"Benchmark tests based on th Norton Utilities System Information Program shows that the Corona ATP is over 60 percent faster than the IBM PC AT and approximately 20 percent faster than the Compaq Portable 286," said Dr. Robert S. Harp, chairman and chief executive officer. "It's faster than all our major competitors' models and is an ideal machine for large power users."

Harp cited software developers, engineers, scientists and programmers who perform numbers-intensive work and others working with large, complex spreadsheets as some target users of ATP.

Other primary features of the ATP, which set it apart from competing AT-compatibles are:

*the fast 83-millisecond average access time of the hard disk ATP model

*the 640 x 400 pixel graphics resolution, twice that of the industry-standard PCs

*the 16 x 13 dot matrix character font in a 16 x 16 dot matrix cell, resulting in very high text resolution.

Because the Corona ATP comes bundled with the MS-DOS 3.1 multiuser operating system and the GW BASIC 3.1 programming language, it may be used in either a standalone mode or as a personal computer hooked to a local area network.

The ATP is available in two configurations. The Model ATP-8-Q includes 512K RAM and a 1.2 megabtye floppy disk drive. The ATP-8-Q20, also with 512K RAM, includes a 1.2 megabyte floppy drive, a 20-megabyte hard disk drive and an AT-compatible hard disk controller.

Both models house a main CPU board, which includes: a built-in floppy disk controller; an IBM PC-compatible parallel printer port; an RS-232C serial communications port; and a socket for an 80287 floating point math co-processor. The built-in green phosphor, non-glare screen is 9 inches.

A built-in color/monochrome video graphics card allows the ATP to be converted into a color system by attaching a color monitor to a jack in the back of the machine. There are five expansion slots, three AT-compatible and two XT-compatible. An enhanced AT-style detachable keyboard features number and caps lock and an XT interface. The ATP measures 18.8"W x 9.6"H x 19.8"D.

Suggested list prices are $4,286 for the ATP-8-Q and $5995 for the ATP-8-Q20.

Corona Data Systems designs, manufactures and markets high-quality high performance, industry-standard microcomputers and peripherals to meet the needs of professionals and small- to mid-sized companies.

For additional information contact Corona Data Systems, Inc., 275 East Hillcrest Drive, Thousand Oaks, CA 91360, (805) 495-5800.

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SideDialer
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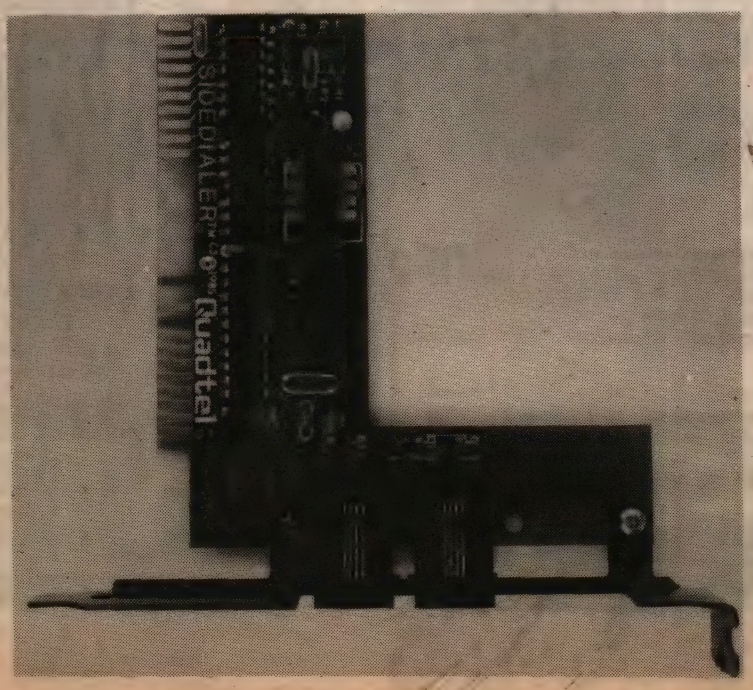
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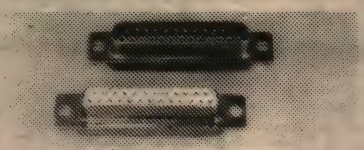
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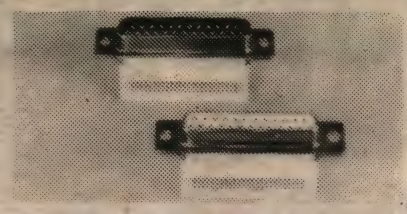


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15S	15 pin female	1.10	1.00	0.92
25P	25 pin male	1.10	1.00	0.92
25S	25 pin female	1.20	1.09	1.00
37P	37 pin male	1.64	1.49	1.37
37S	37 pin female	1.80	1.64	1.50
50P	50 pin male	2.62	2.38	2.18
50S	50 pin female	3.70	3.36	3.08



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IDC15S	15 pin female	3.25	3.00	2.79
IDC25P	25 pin male	3.73	3.45	3.20
IDC25S	25 pin female	4.28	3.95	3.67
IDC37P	37 pin male	4.75	4.38	4.07
IDC37S	37 pin female	5.63	5.20	14.83
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C15S	15 pin female	0.73	0.64	0.58
C25P	25 pin male	0.75	0.67	0.60
C25S	25 pin female	0.75	0.67	0.60
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C37S	37 pin female	1.00	0.91	0.83
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P15P	15 pin male	1.12	1.02	0.93
P15S	15 pin female	1.98	1.80	1.65
P25P	25 pin male	1.56	1.42	1.30
P25S	25 pin female	3.06	2.78	2.55
P37P	37 pin male	2.14	1.95	1.78
P37S	37 pin female	4.36	3.96	3.63
P50P	50 pin male	2.74	2.49	2.28
P50S	50 pin female	5.68	5.16	4.73



PC MOUNT RIGHT ANGLE

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R9P	9 pin male	1.60	1.45	1.33
R9S	9 pin female	1.62	1.47	1.35
R15P	15 pin male	1.52	1.38	1.27
R15S	15 pin female	1.54	1.40	1.28
R25P	25 pin male	1.96	1.78	1.63
R25S	25 pin female	1.98	1.80	1.65
R37P	37 pin male	2.94	2.67	2.45
R37S	37 pin female	2.98	2.71	2.48



CRIMP CONTACTS

PART #	DESCRIPTION	PRICE/QTY 1-99	100-999	1K-4999
CP20P	male contact	0.080	0.063	0.050
CP20S	female contact	0.100	0.068	0.054



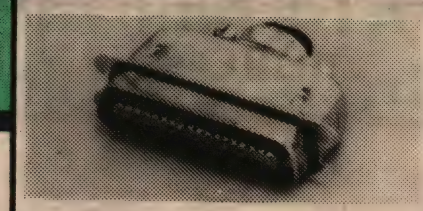
CRIMPING TOOL

CT-1645	professional ratchet type	79.95



EXTRACTOR TOOL

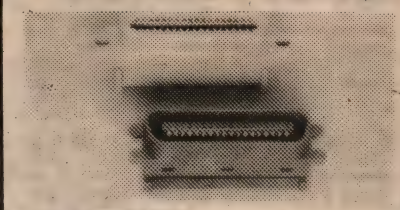
EXT-1	removes crimp contacts	2.75



CENTRONICS SOLDER TYPE

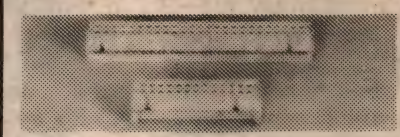
PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
CEN-36P	36 pin male	3.00	2.67	2.40
CEN-36S	36 pin female	3.66	3.33	3.05

RIBBON CABLE CONNECTORS



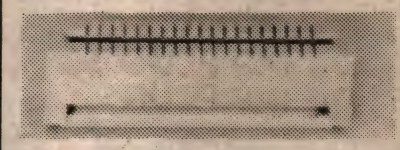
57 SERIES

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
ID57-24P	24 pin male	5.00	4.62	4.29
ID57-24S	24 pin female	5.50	5.08	4.71
ID57-36P	36 pin male	4.25	3.78	3.40
ID57-36S	36 pin female	5.50	5.00	4.58
ID57-50P	50 pin male	8.03	7.42	6.89
ID57-50S	50 pin female	7.52	6.94	6.44



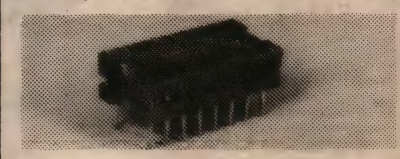
IDS SOCKET CONNECTOR

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
IDS10	10 pin socket	0.94	0.85	0.78
IDS14	14 pin socket	1.00	0.91	0.83
IDS16	16 pin socket	1.12	1.02	0.93
IDS20	20 pin socket	1.18	1.07	0.98
IDS26	26 pin socket	1.50	1.36	1.25
IDS34	34 pin socket	1.78	1.62	1.48
IDS40	40 pin socket	1.98	1.80	1.65
IDS50	50 pin socket	2.32	2.11	1.93
IDS60	60 pin socket	2.70	2.45	2.25



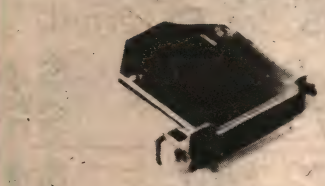
IDE EDGECARD CONNECTOR

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
IDE10	10 pin edg.crd.	1.30	1.16	1.04
IDE14	14 pin edg.crd.	1.55	1.38	1.24
IDE20	20 pin edg.crd.	1.75	1.56	1.40
IDE26	26 pin edg.crd.	2.13	1.89	1.70
IDE34	34 pin edg.crd.	2.50	2.22	2.00
IDE40	40 pin edg.crd.	2.88	2.56	2.30
IDE50	50 pin edg.crd.	3.50	3.11	2.80



IDD DIP PLUG CONNECTORS

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
IDD14	14 pin dip plug	0.85	0.77	0.71
IDD16	16 pin dip plug	0.95	0.86	0.79
IDD24	24 pin dip plug	1.65	1.50	1.38
IDD40	40 pin dip plug	2.75	2.50	2.29



GREY HOODS

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
GH9	9 pin hood	0.68	0.60	0.54
GH15	15 pin hood	0.80	0.71	0.64
GH25	25 pin hood	0.85	0.76	0.66
GH37	37 pin hood	1.06	0.96	0.88
GH50	50 pin hood	1.10	1.00	0.92



DUAL HOODS

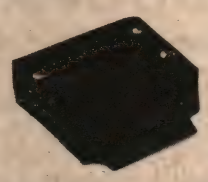
PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
DH25	25 pin hood	1.13	1.00	0.90
DH37	37 pin hood	1.17	1.04	0.94

SHIELDED HOODS

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
SH9	9 pin hood	0.80	0.71	0.64
SH15	15 pin hood	0.88	0.78	0.70
SH25	25 pin hood	1.00	0.89	0.80
SH37	37 pin hood	1.72	1.56	1.43

D-SERIES HARDWARE

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
MDH-1	male d-series hardware	0.55	0.35	0.25
FDH-1	female d-series hardware	0.75	0.65	0.55



AMP HOOD

PART #	DESCRIPTION	PRICE/QTY 1-49	50-99	100-499
AH25	25 pin hood	1.25	1.00	0.83



RS-232 WALL PLATES

PART #	DESCRIPTION	PRICE/QTY 1-9	10-24	25-49
WP-1	one slot	1.88	1.36	1.25
WP-2	two slot	2.13	1.55	1.42



RS-232 GENDER CHANGERS

PART #	DESCRIPTION	PRICE/QTY 1-9	10-24	25-49
AGC-M	male gender changer	7.95	7.27	6.67
AGC-F	female gender changer	7.95	7.27	6.67

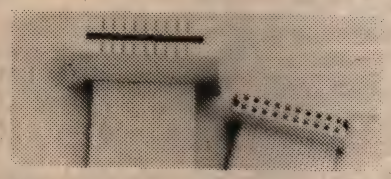
ALTEX ELECTRONICS

RIBBON CABLE ASSEMBLIES



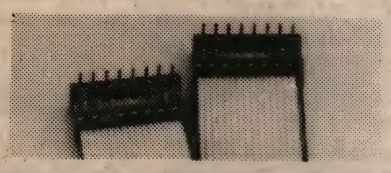
D-SERIES

PART #	DESCRIPTION	PRICE
9P-9P	9 pin male to male	5.64 + .18 per ft.
9P-9S	9 pin male to female	5.86 + .18 per ft.
9S-9S	9 pin female to female	6.08 + .18 per ft.
15P-15P	15 pin male to male	7.44 + .30 per ft.
15P-15S	15 pin male to female	7.62 + .30 per ft.
15S-15S	15 pin female to female	7.80 + .30 per ft.
25P-25P	25 pin male to male	8.96 + .50 per ft.
25P-25S	25 pin male to female	9.62 + .50 per ft.
25S-25S	25 pin female to female	10.28 + .50 per ft.
37P-37P	37 pin male to male	11.40 + .74 per ft.
37P-37S	37 pin male to female	12.46 + .74 per ft.
37S-37S	37 pin female to female	13.52 + .74 per ft.
50P-50P	50 pin male to male	25.96 + 1.00 per ft.
50P-50S	50 pin male to female	27.45 + 1.00 per ft.
50S-50S	50 pin female to female	28.94 + 1.00 per ft.



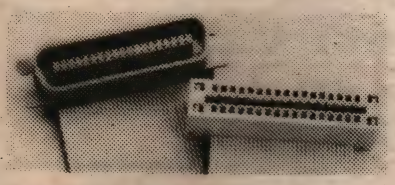
IDS SOCKET TO IDE EDGECARD

PART #	DESCRIPTION	PRICE
10S-10E	10 pin socket to edg.crd.	3.20 + .20 per ft.
14S-14E	14 pin socket to edg.crd.	3.50 + .28 per ft.
20S-20E	20 pin socket to edg.crd.	3.75 + .40 per ft.
26S-26E	26 pin socket to edg.crd.	4.75 + .52 per ft.
34S-34E	34 pin socket to edg.crd.	5.40 + .68 per ft.
40S-40E	40 pin socket to edg.crd.	6.45 + .80 per ft.
50S-50E	50 pin socket to edg.crd.	7.85 + 1.00 per ft.



IDD DIP PLUG TO IDD DIP PLUG

PART #	DESCRIPTION	PRICE
14D-14D	14 pin dip plug cable	2.60 + .20 per ft.
16D-16D	16 pin dip plug cable	2.75 + .32 per ft.
24D-24DE	24 pin dip plug cable	3.75 + .48 per ft.
40D-40D	40 pin dip plug cable	7.50 + .80 per ft.

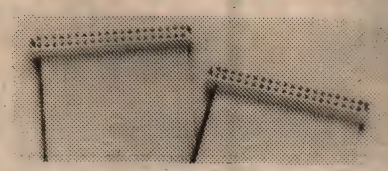


RADIO SHACK PARALLEL PRINTER CABLE

PART #	DESCRIPTION	PRICE
36P-34E	36 pin male to 34 pin edg.crd.	8.50+.68 per ft.

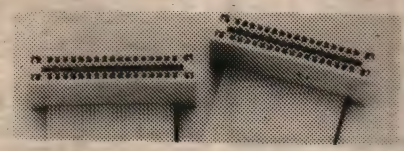
HARD DRIVE CABLE ASSEMBLIES

PART #	DESCRIPTION	1-9	10-24	25-49
HDC-22	22" hard drive cable assy.	8.50	7.73	7.08



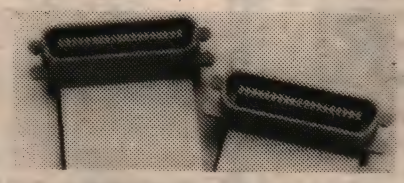
IDS SOCKET TO IDS SOCKET

PART #	DESCRIPTION	PRICE
10S-10S	10 pin socket to socket	2.00 + .20 per ft.
14S-14S	14 pin socket to socket	2.50 + .28 per ft.
16S-16S	16 pin socket to socket	2.75 + .32 per ft.
20S-20S	20 pin socket to socket	2.85 + .40 per ft.
26S-26S	26 pin socket to socket	3.50 + .52 per ft.
34S-34S	34 pin socket to socket	4.10 + .68 per ft.
40S-40S	40 pin socket to socket	4.50 + .80 per ft.
50S-50S	50 pin socket to socket	6.15 + 1.00 per ft.
60S-60S	60 pin socket to socket	6.65 + 1.20 per ft.



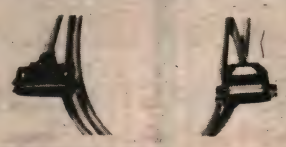
IDE EDGECARD TO IDE EDGECARD

PART #	DESCRIPTION	PRICE
10E-10E	10 pin edg.crd. to edg.crd.	3.80 + .20 per ft.
14E-14E	14 pin edg.crd. to edg.crd.	4.00 + .28 per ft.
20E-20E	20 pin edg.crd. to edg.crd.	4.50 + .40 per ft.
26E-26E	26 pin edg.crd. to edg.crd.	5.30 + .52 per ft.
34E-34E	34 pin edg.crd. to edg.crd.	5.90 + .68 per ft.
40E-40E	40 pin edg.crd. to edg.crd.	7.00 + .80 per ft.
50E-50E	50 pin edg.crd. to edg.crd.	8.50 + 1.00 per ft.



57 SERIES RIBBON CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICE
5724P-P	24 pin male to male	10.00 + .48 per ft.
5724P-S	24 pin male to female	10.50 + .48 per ft.
5724S-S	24 pin female to female	11.00 + .48 per ft.
5736P-P	36 pin male to male	8.00 + .72 per ft.
5736P-S	36 pin male to female	10.00 + .72 per ft.
5736S-S	36 pin female to female	12.00 + .72 per ft.
5750P-P	50 pin male to male	16.75 + 1.00 per ft.
5750P-S	50 pin male to female	16.25 + 1.00 per ft.
5750S-S	50 pin female to female	15.75 + 1.00 per ft.



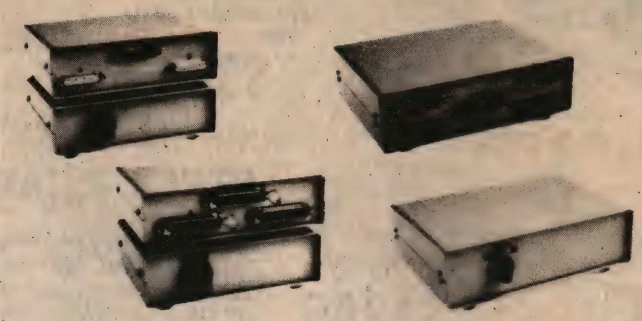
IBM CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICE/QTY 1-9	10-24	25-49
PPC301-6	6 ft. parallel printer cable	10.40	9.45	8.67
PPC301-10	10 ft. parallel printer cable	12.00	10.91	10.00
ATSC-10	10 ft. AT serial printer cable	19.90	18.09	16.58
MEC-10	10 ft. monitor extention cable	3.75	3.00	2.73
KEC-10	10 ft. keyboard extention cable	3.63	2.64	2.90

MISC. CABLE ASSEMBLIES

PART #	DESCRIPTION	PRICE/QTY 1-9	10-24	25-49
CC1	Atari cable, 13 pin male to female	11.88	9.50	8.64
CC2	Atari int. to parallel printer	13.13	10.50	9.55
CC4	5 pin din to 4 RCA plugs	3.60	2.88	2.62
CC8	6 pin din male to male	3.50	2.80	2.55
CC11	RGB monitor cable	9.13	7.30	6.64
JYA	joystick "Y" adapter	4.00	3.20	2.91

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- COMPACT, BUILT TO LAST
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AB25-3	3 port serial	82.50	AB36-4	4 port parallel	120.00
AB25-4	4 port serial	95.00	AB36-5	5 port parallel	145.00
AB25-5	5 port serial	115.00	AB25-X	serial crossover switchbox	87.50
AB36-2	2 port parallel	92.50	AB36-X	parallel crossover switchbox	117.50

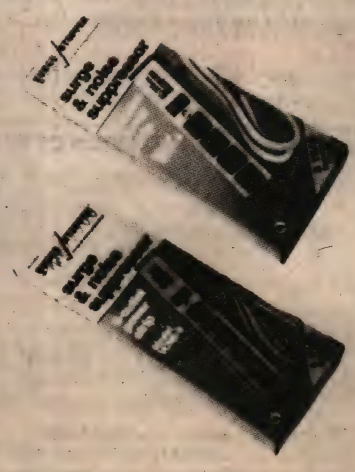
ECONOMY PUSHBUTTON SWITCHBOXES



PART #	DESCRIPTION	PRICE	PART #	DESCRIPTION	PRICE
AB25P	2 port serial	44.00	AB36P	2 port parallel	54.00

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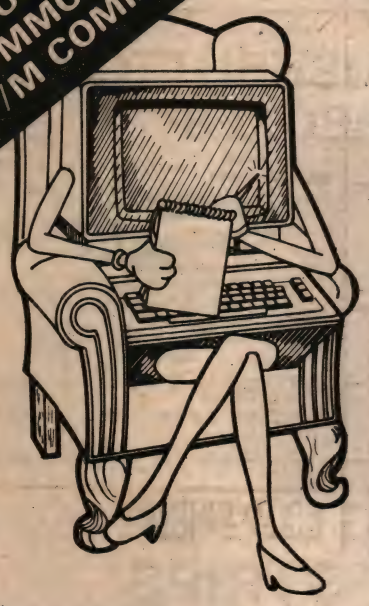
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Some Fine Points
continued from page 116

can then be evaluated as 2x1 = 2 followed by 3x2 = 6. Finally the first unanswered call can be evaluated as 4x6 = 24 which is the desired answer.

The Pascal code for calculating factorials is shown in listing 2. Line 9 simply checks to see if 0! or 1! is desired. If so the answer is 1. Recursion does not occur. However, for factorials larger than 1, line 12 is executed until the argument (NUMBER - 1) equals 1. At this point CALC_FACTOR has a value of 1. Each preceding call is then answered in reverse order. After the last call is completed control is returned to the calling program and the answer printed.

As written this particular recursive example has several limitations. First, my 2.0 version of Turbo Pascal only allows integer values between -32,768 and 32,767. The range of real numbers is 1E-38 through 1E + 38. This means 7 is the largest integer for which the factorial can be found. Changing NUMFACTOR, NUMBER, and CALC_FUNCTION from type integer to type real allows 33! to be calculated with some loss of accuracy. Finally no check is made to see if the input is a negative number. Since 1 is subtracted from the number (line 12) the function will never encounter a condition where an answer is found if a negative number is entered. It will call itself until the number of unanswered calls uses all the memory or until NUMBER is less than -32,768 at which point a fatal error occurs.

The recursive function call wasn't added to Pascal just to calculate factorials and X since Pascal's common features can be used to write solutions to both cases. These problems are not easily solved using standard features and make recursion the prefered method. and make recursion the preferred method.

To summarize, functions are really a small world of their own which use the parameter list to get information from the calling line. The isolation provided by functions make them ideal tools for coding modules created by top down design. Functions pass one item back to the calling line via the function name.

The parameter list in the calling line and the function heading line must be identical as far as the number and type of items to be passed but the identifiers may be any of the legal names allowed by Pascal.

The intended purpose of the function (1 or more input items but only 1 output item) can easily be circumvented by using the parameter list. As will be explained in part two, the parameter list can be used as a 2 way street to pass information to and from functions and/or procedures. Sending additional information from the function to the calling line via the parameter list is legal but not recommended because the interface between the function and the program becomes mmore complex. This makes the program more difficult to write, debug, and maintain. Hence the need for a more powerful version of the function which is designed for two way flow of data.

The procedure is designed to handle this need. It is used when 1 or more items are passed to the procedure *and* when more than one item is to be returned to the main program. Part two will tackle procedure with a short program which estimates 1985 federal income tax. ●

```
 1  PROGRAM FACTORIAL (INPUT,OUTPUT);
 3  VAR
 4    NUMFACTOR : INTEGER;
 6  FUNCTION CALC_FACTOR (NUMBER: INTEGER) : INTEGER;
 8    BEGIN
 9      IF (NUMBER = 0) OR (NUMBER = 1)
10        THEN CALC_FACTOR := 1
11        ELSE
12        CALC_FACTOR := NUMBER * CALC_FACTOR(NUMBER -1);
13    END;
15    BEGIN
17      WRITELN('ENTER THE INTEGER WHOSE FACTORIAL YOU WISH CALCULATED');
18      READLN(NUMFACTOR);
19      WRITE('THE FACTORIAL OF ',NUMFACTOR,' IS ');
20      WRITELN(CALC_FACTOR(NUMFACTOR));
21  END.
```

Listing 2. Program to calculate factorials using a recursive function call.

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Inside the Commodore
continued from page 56

Commodore interface. You might check that out. A better choice (for reasons explained below) might be an Olympia "Electronic Compact 2" typewriter with its built-in Centronics interface. I use one on my C-64 with the User Port interface and my favorite wordprocessor. The Olympia has the advantage of being both a fine electronic typewriter and a daisy wheel printer (my wife, who is intimidated by computers, likes that fact).

I think the Epson Homewriter is fine, but the LX-80 is better. The Homewriter is basically a dedicated version of the Epson LX-80. The LX-80 has a standard Centronics interface. The Homewriter has a Commodore serial bus interface instead (other versions of the Homewriter have IBM, Apple, and Atari interfaces built-in). I would rather buy the LX-80 and use either a serial bus to Centronics interface or the User Port interface. The same is true of any brand of printer, I recommend you buy the most generic version available. That way, if you get another computer or upgrade to an Amiga, your printer will still work with them. Also, when you eventually go to sell it, a generic parallel interface printer has a larger market than a Commodore-only model. By the way, Commodore's newly announced MPS-1000 printer bears a suspicious resemblance to the Homewriter. Me thinks it may be an Epson in Commodore trimming. If not, it sure looks like a close clone.

I don't really have any particular "Commodore specific" magazine that I recommend, but I submit that Commodore's own magazine (*Commodore Microcomputers* and *Power Play*) are both underrated. Their overall content has improved *greatly* in the past couple of years. You might find them to your liking instead of the usual *RUN, Ahoy, Gazette* type magazines annoy you. My own personal favorites (other than *The COMPUTER SHOPPER*, of course) are *Transactor* and *INFO* (used to be called *INFO-64*). *Transactor* is more technically oriented and less pretensious than most the others. *INFO* is full of the latest gossip about anything Commodore is doing and gives fair, in depth, reviews about a lot of Commodore oriented products. I like them both because the editorial staff is committed to Commodore (not "converted" Apple or IBMers) and they generally have more depth in their content.

As for your choices for a computer for wordprocessing, the C-128 sounds excellent. Which provides a convenient transition to our next topic:

The C-128 - Best Home Computer Ever?

I imagine by now you've at

continued on page 129

WATFOR-77
continued from page 106

PC. By elminating both the need to produce object files and the often lengthy linking process, WATFOR-77 can be used to develop and debug programs in a shorter amount of time than is possible with other compilers.

With WATFOR-77, programmers are extremely productive in the development and maintenance cycle. Once a program is completely debugged, another FORTRAN compiler could be used to produce highly optimized code. In research or educational environments, there is often no need to use optimizing compilers, since programming projects are complete when a program successfully executes once.

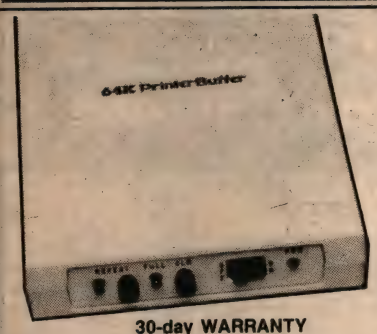
There are two versions of WATFOR-77 for the IBM PC. One version requires the 8087 math coprocessor and uses this device extensively for both integer and floating-point arithmetic. The other version does not use the 8087 but provides the same level of accuracy in floating-point computations. WATFOR-77 makes use of all available memory on the IBM PC. Like WATFIV, WATFOR-77 has Structured Programming statements as extensions to the FORTRAN language. An interactive debugging system is integrated with the compiler and the WATCOM Editor is included with the software.

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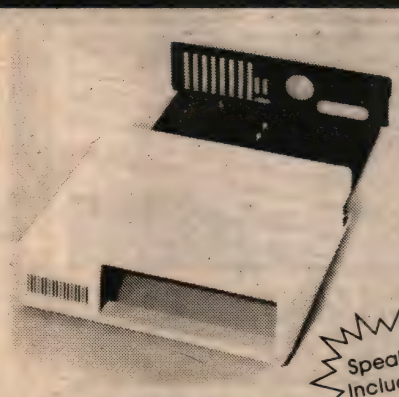
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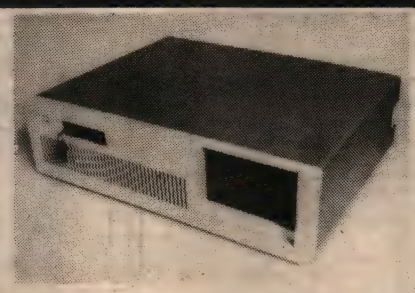
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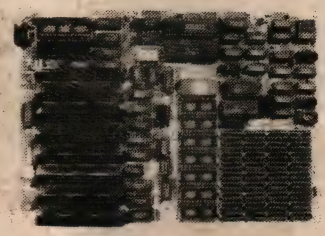
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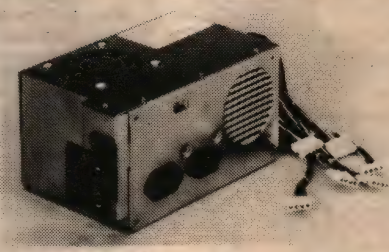
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Hands ON!

continued from page 56

floppy disk drive stores 880K on a disk, but you still end up with lots of little floppies laying around. The disk drive seems to be a tad slow for "hyper-DMA transfer," but not as bad as the Macintosh's lethargic drives. This is just my initial impression from a few hours of use. I use a Zenith-150 PC with a 10 Meg. hard drive all the time and most all small floppies seem slow to me, anyway.

Blank 3.5 inch double sided disks may be a little hard to get for a while, since Macs (the biggest users of 3.5 disks up to now) use only single sided drives. (Apple plans to upgrade the Mac drives to double sides in early '86.) If you need some double sided 3.5 disks now, try a Data General or Kaypro dealer. The DG One uses double sided drives, as does the Kaypro 2000.

A second, external, drive is a $300 option ($295 to be exact). It connects to the Amiga through a port on the back and is housed in a small stand alone case. If you're doing any serious software development, I think a second floppy drive is almost a necessity. When copying files between disks on a single drive Amiga, you are prompted many times to swap disks. A second drive eliminates this. A hard disk would also be a big improvement. (Techmar has a 20 Meg. unit due for shipment "real soon now." Price: $1200 or so.)

I/O Ports

Commodore has wisely given up on it's weird proprietary interfaces for the Amiga and put a Centronics parallel port and (real) RS-232 ports on the system box. some minor pin differences exist between the Amiga's port and most standard interfaces. You can identify them by checking the User's Manual diagrams. Some of the Amiga's pins have voltages on them when they should be grounded or no connection. Make sure you check the printer or modem pinouts against the Amiga's documentation before connecting or you might run into some problems.

There appears to be a small bug in the Amiga's serial port. Some software developers working on terminal programs have run into it. Apparently, it's difficult to sense when a received character has arrived at the port. This may be a software problem, but the whole jury isn't in as of this writing. Commodore has distributed a serial file transfer program for the Amiga to software developers that appears to work fine. So, this "bug" may be just a misunderstanding on the part of users.

Video Game Machine + Digital VAX = Amiga!

As you probably know, the Amiga not only has a 68000 processor CPU running at 7.15 Mhz+ (with no wait states), but also three other chips that handle the screen display, graphics animation, and I/O tasks using DMA and full interrupts. Of the three other chips (strangely named 'Denise,' 'Agnus,' and 'Paula' respectively), the two video chips ('Denise' and 'Agnus') are the most interesting.

Just how you get those graphic chips to work in your programs is somewhat difficult to understand, to the uninitiated, but Commodore promises to reveal all secrets...in time. Right now, only those on the Commodore-approved "developer's list" can get that information. (Boooo!) It appears the Amiga has low-level software routines built-in to handle most of the hard work. All you have to do is make the right ROM system calls from Assembler or 'C'. Programmers who have worked with both the Mac and the Amiga say the Amiga is a dream to program in comparison. (By the way, Lattice 'C' is the language of choice for serious Amiga development. Commodore is providing both native compiler and IBM-PC cross compiler to developers.)

Windows, sprites, multiple bit-maps, smooth scrolling, and hi-res animation are not just handled in software, but by the hardware too. The software just sets up the parameters to the 'Denise' and 'Agnus' chips. They do their job with very little load whatsoever on the 68000 itself. It's freed up for pure "number crunching," interrupt handling, or whatever. This is the reason that the Amiga is so much faster than the Macintosh, which tends to do everything in software. The Amiga is more than just a color Macintosh. It is an extreme-

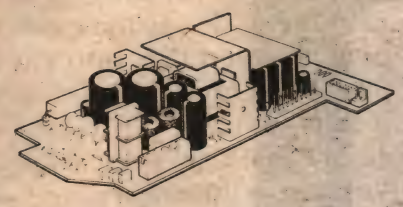
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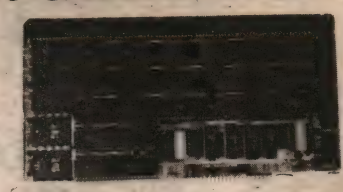
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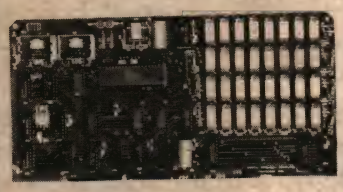
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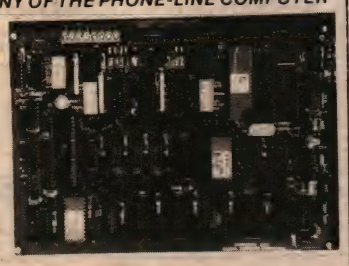
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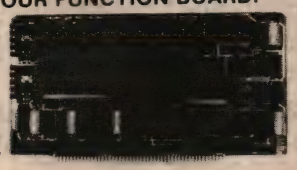
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Koronis Rift
continued from page 55

ships were set to prevent looting. (And you look just like a looter.)

Your rover is equipped with shields and a laser, barely the minimum needed to survive. Any other equipment you pick up in your search can be used if you take the time to install it and turn it on. Or you can take it back to your scoutship in orbit and have it analyzed and dismantled for trade when you finish the trip. Since several different cultures contributed to the junk, some of the modules you pick up will be more efficient or more powerful than others. The Psytek Analyzer will give you ratings for each module.

The ultimate goal of Koronis Rift is to destroy *all* the guardian ships and their base located in the last rift, so you can claim the planet for your own. But along the way you can try to get as much tradable goods as you can. You don't get credits for a piece until it's dismantled and stored away. I had a lot of games where my score was 0. Good luck. It isn't easy.

Koronis Rift has an interesting scenario. The controls take a little bit of adjusting to as with any game. Once you get used to them, you have a variety of strategies to try. This one takes more than just a quick hand and eye.

The high resolution scenery is nice as it whizzes by outside your viewport. You have a homing device to help you find what you're looking for. A speedometer and other system indicators keep you apprised of your equipment's condition. Watch your shields!

Koronis Rift has some outstanding graphics. The Psytek robot in action is a killer. Eyes move, along with arms and hands. A viewer to the right looks strangely like a computer screen and a keyboard looking apparatus sits just below it. Hmmmmm.

Epyx has another winner here.

Koronis Rift
Epyx
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Hands ON!
continued from page 124

ly high-speed "color Macintosh," if you prefer. Running the two machines side-by-side will show a marked speed difference between them.

All This, and Color, Too!?!

The Amiga can display a total of 4096 different colors. But, the more colors on the screen at once, the more RAM and processor overhead is required to maintain them. So even though 4096 are possible, the Amiga usually only displays about 16 or 32 different colors at once.

The video output of the Amiga includes RGB (Red, Green, Blue) and composite video for use with just about any kind of monitor. The Amiga has both "analog RGB" output as well as standard "digital RGB" output. A digital RGB monitor, can only display 16 of the 4096 colors. But an analog RGB monitor can display all 4096 colors. So, the type of color monitor determines in large part, how much of the Amiga's graphics capabilities you can use.

Monitors: Good, Bad, and Ugly

The standard Amiga color monitor is an "analog" version that looks great. The screen is full of vibrant color that has nary a bit of the "bleed" often seen on composite color monitors, like the ol' 1702. If you haven't worked with RGB monitors before, you'll be impressed.

Some Amiga owners are using Sony RGB monitors. Sony has a line of "super hi-res" analog RGB monitors that even Commodore is rumored to have been using for their own development work. Sony also has a line of RGB monitors that double as TV receivers. They are called the "XBR" line and apparently they deliver stunning results. Screens are available in sizes from 19" on up. Commodore was demonstrating the Amiga hooked up to an "XBR" at a recent convention in Omaha.

continued on page 130

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Computer Smyth's primary interest is hands-on construction, modification and expansion of micros. We see the IBM PC phenomenon as a giant magnet or vacuum, dragging hardware and software talent into a vortex of activity that ignores and overshadows the line of new CPUs and peripheral hardware enhancements that are becoming available. We believe 32-bit architecture is the proper and exciting growth direction for micros and too little talent is being invested in that opportunity.

Computer Smyth's editors are also determined to cover all opportunities including the rich offerings of the IBM lines as they appear and especially to evaluate the so-called clones.

We believe magazines are hard-copy networks—or extensions of the central nervous systems of those who read them and interact with each other through them. The inter-stimulus factor accelerates each participant's learning curve, produces new combinations of ideas and new answers, and defines fresh problems. We are content and idea centered—not just a sales medium for consumer goods.

Who reads *Computer Smyth?* We're looking for the intelligent, technically curious and adventurous computer buff who isn't afraid to take the back off the case, who likes new experiences and digs into any device, unsatisfied until all its mystery is dispelled and its potential is fully in hand. Our reader is a craftsman who enjoys building, even while finding the adventure just a little scary.

Our first-year line-up included: The SC84 computer; a brand new Z80 system with exceptionally powerful peripheral possibilities and a plain English description of each and every capability of the machine and its operating system; an X/Y charter/plotter you can build for under $60 that will teach you a lot about how these devices work; a neat, powered wire-wrap tool for two hours of your time and a little more than the price of the tool's bit; an RGB color to composite converter board; Ed Scott's three part series on his 68000 computer; Ken Barbier on printer interfaces; a multipen plotter upgrade; a Data Destroyer (for super clean disks) a review of the DTC XT clone; an RMN converter; and an audio module for the Atari 8000.

Coming up in 1986: a switched power supply; an EPROM programmer; a safe, active circuit tracing tool; a silicon disk; how to identify and find microchips; how to buy a superplus keyboard; and builder reports on four single-board computers: Z80, 64B180, PC and XT.

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Inside Commodore
continued from page 122

least had a chance to get a look at the C-128, 1571, and 1902 (if Santa Claus didn't leave you one)! I must admit I'm impressed. The hardware is a definite improvement over everything I've seen that has the Commodore name on it. There is more computer in the C-128 than anything Commodore has ever built (with the possible exception of the Amiga). And, I'm including all the old PET/CBM machines.

The keyboard of the C-128 is the best I've seen on Commodore equipment (although the defunct B-128's was almost as nice). The graphics are really fantastic as displayed on the new 1902 RBG monitor (in fact, I've seen software on the 128 that almost rivals the Amiga for resolution and color). And the documentation that comes with the system is *light years* beyond anything that Commodore has thrown in with basic systems before. (Although we're still waiting for the Programmer's Reference Guide to show up.) I haven't see the full CP/M Plus documents yet, since Commodore charges extra for them, but I expect they will be worth the $20.

There's really no comparison between the C-128 and the Atari 800XLs, Radio Shack CoCos, and most other home computers now on the market. There's just so much more hardware and software (BASIC 7.0, CP/M Plus) built-in. Of course, you can expand those other systems to have about the same capabilities, but the point is they don't come that way standard. You have to double or triple your investment in them to get the same features.

It's interesting to note that the C-128 is actually the latest inheiritor of the VIC-20's dominion. Jack Tramiel conceived and promoted the VIC as 1) a way to provide exceptional computing power to the masses at consumer prices and 2) the lead machine to keep the Japanese invasion of the home computer market at bay. The C-64 was the next step in that process. Now the C-128 is doing the same thing. The C-128 is the first machine to bring hires color graphics, acceptable business text (80x24), CP/M capability, and an established base of software (C-64) to the market for well under $1000. The Japanese were planning to "mop up" the low end of the market this year with their "MSX" line of home computers. But when they saw the C-128's specs (and the Atari ST and Amiga), they went "back to the drawing board" (for the umpteenth time).

Using the 1571 - Some Hints and Kinks

It seems the 1571 drive can be used in the double sided mode with the C-64. Early indications were that it wouldn't. If you send the following command to the drive, it will "lock" it into the double sided mode;

OPEN 1,8,15, "UO>M1"

This opens up 334 more blocks per disk for storage... be sure and format the double sided disk first (with "NEW"). I don't know how well this works with copy protected programs though.

You can also lock the 1571 into the single sided mode with:

OPEN 1,8,15 "UO>MO"

The reason you might want to do that is because the drive is normally in the double sided mode, set at power-up. If you are working with a lot of disks that were formatted single sided, you will find the drive tries to read them as double sided everytime. It takes a while for the drive to determine that they are single sided and switch over. By locking into single side mode, it speeds up the process.

In the CP/M Plus mode, the 1571 is really remarkable. It is set up to read just about every format on the market. The 1571 I tried even read Kaypro IV format disk. That's really unusual. My Zenith Z-150 can't read Kaypro IV format (nor can most other computers), unless the disk has first been formatted on the Zenith, because the disk format on the Kaypro IV is quite different from most every CP/M disk. Yet, when I stuck a "native" Kaypro IV disk in the 1571, a little window appeared on the bottom of the C-128's screen that said "Kaypro IV/10" and it began to read the disk with no problems. I understand that if you stick a non-Commodore disk in the 1571 and issue a read command (like "DIR"), you can cursor down to little window on the screen. Then using the cursor keys, you can scroll through a list of disk formats that are available. If none of the formats match the disk you've got, you can re-program that 1571 to read any MFM formatted disk, period. With a little programming, it will even read IBM-PC PC-DOS disks.

One program that has yet to be written is a fast disk back-up program for the 1571. Using "PIP" and two 1571s, it took a half hour to make a back-up of a full CP/M disk (one was in Kaypro format). Although "Fast Hack 'Em" (a popular 1541 disk copy program) will let you copy two 1541 disks in under a minute, it doesn't work with the CP/M disks (especially "foreign types"). Since CP/M disks aren't copy protected (generally), it shouldn't be too difficult to write a fast copy program. When that appears, the slow "PIP" copy procedure will be a thing of the past.

68000 Cross Assembler for CP/M

If you are interested in getting your feet wet with 68000 assembly language (for when your Amiga arrives), there is a public domain cross assembler that will run under CP/M Plus. It has been uploaded to Delphi's Flagship Commodore user group. If you aren't a member of Delphi, you can also get the program from a CRBBS or CP/M user group on SIG/M disk #92. You can send me $5 for a disk copy fee and I'll send it to you postpaid.

Timeworks C-128 Software Greatly Improved

I once mentioned Timeworks Software's "Word-Writer" and "Data Manager 2." Those were among some of the worst C-64 software products I ever saw: (Although their "SwiftTax" program wasn't too bad.) Well, now Timeworks has now introduced "SwiftCalc-128," "Word-Writer-128," and "Data-Manager-128." They are totally unlike what I saw on

continued on page 129

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- *WORDFLEX 1.60(#66) Another full featured word processor.*
- *EDIT 1.11(#294) A general purpose text editor.*

Screen editors
- *SCREEN(#86) A full screen text editor.*
- *FRED(#83) A full screen editor.*

Text processing tools
- *PC-READ(#194) Computes 'fog' index-Is your writing understandable?*
- *REFLIST(#231) Reference lister.*
- *UTIL 1.2(#60) A number of very useful utilities. UNWS(#81) UNWordStar converts from Wordstar to ASCII.*
- *ROFF(#50,#194) You can make nice printouts of a file.*
- *PASCAL TOOLS(#130-#132)*

Database programs
- *PC-FILE III(#5) The most popular filing program.*
- *DATABASE OF STEEL 3.1 (#214,#215,#267,#268) Database spreadsheet expert system.*
- *NEWBASE(#233) Menu driven data base in BASIC.*
- *FILE EXPRESS(#287,#288) Menu driven information management.*
- *ABC-FILE 1.1(#119) A user friendly small database program.*
- *3 BY 5 1.0(#253) File info on equivalent of 3x5 cards.*
- *LABELS(#261) Address label system.*
- *LISTMATE 1.0 (#252) Menu driven label maker for use with MultiMate.*

Databases
- *LETUS A-B-C(#121-#123) Computer magazine references. Requires PC-FILE III.*
- *BOBCAT(#247) business references.*
- *MICROGOURMET 1.10(#116,#117)Food database, requires dBASE II.*

Spreadsheets
- *PC-CALC(#199) A widely used, friendly spreadsheet by the author of PC-FILE III.*
- *PC-CALC(Guy Gordon's)(#244) For smaller applications.*
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- *PROGRAMMER'S CALCULATOR (#87) A powerful RPN calculator plus a fast and efficient way to convert numbers between dicimal, hexadecimal, binary, and octal.*
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- *PC-COMPARE 1.24 (#113) Flexible ASCII file compare.*
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Great American Road Race

by Cheryl Peterson

Shades of Cannonball Run. The Great American Road Race certainly lives up to its name. It is great. Bored with car races that go round and round in a dull little circle? Well, this race game is a definite improvement. Cross country, real scenery, changing weather. Cities whose skylines are actually recognizable. (Yes, I've seen most of them.) And the intervening inter-states have fairly consistent scenery. Desert where you'd expect to find desert, etc. Wow! Simulated dawn, daylight, dusk and night driving. And they coincide with a clock that times your travels.

Check out the field of competitors. With names like Daring Dan, Move Over Mary, Jet Engine Jim, Jersey Jessica and Jump Start John, these folk should be some competition. When you're on the road, they're all around you. Each driver has his own driving habits and best times. As you navigate across the country, the competition will pass or lag behind depending on how fast you are going. If you aren't keeping up with Very Fast Vicky's best time, she's gonna pass you in a cloud of dust. Figuratively, that is. Since you have to stay on the roads, there isn't much dust.

With four different routes to drive, you won't get tired of repeating scenery. Seattle to Miami, LA to New York, San Francisco to Washington and the US Tour. Each trip has several legs to it and you can take alternate routes, if you want to avoid bad weather conditions. To win the US Tour you've got to pass through every major city in the continental US.

Driving is similar to driving a stick shift car, but of course, there's no clutch pedal. You'll have to make do with the joystick. Your racer has four gears and you've got to change them as you race. The engine whine isn't as realistic as it could be, though it took me only a short while to get used to where to switch to the next higher gear. When your tach gets to 9600, it's time to switch up. Watch your gas gauge, pushing the car to the next gas station can

continued on page 132

Eidolon

by Cheryl Peterson

The Eidolon is another fine game from Epyx courtesy of Lucasfilm Ltd. Yes, the folks who brought us Star Wars, Indiana Jones and Rescue on Fractalus have taken to their computers again. And once again they've come up with an interesting and challenging arcade thriller.

The Eidolon is a strange and barely understood invention that is the key to a dungenous cavern populated by weird little creatures that appear to be dangerous only to the power supply of the Eidolon. Being touched by any of the creatures drains the Eidolon's power supply and sends you spinning back to the lab and you must start your journey of exploration over again.

Each level of the caverns has one dragon which must be overcome to proceed to the next level. Before facing the dragon, the intrepid adventurer must first locate a crystal that will allow him to bypass a shimmering wall protecting the dragon. (Or is it really protecting you?) The farther you venture into the cave the more intricate the passages become. Creating a map as you explore is certainly not a bad idea.

Different colored fireballs drift through the corridors of the cave. Some are deadly to the Eidolon; others are a power source for it. Blue ones appear to stop time and green ones change the residents from one form to another. The red ones (though deadly) can be used as a power source if you know how to change their form.

Using the special graphics system developed by Lucasfilm, Ltd., the game uses first person perspective of the cave. You seem to be floating along, directing the Eidolon's course through the twisting and turning passages. The three dimensional effect is quite strong.

The sounds are well done, including the fireballs ricocheting off the walls of the cavern and the echoes of old collisions ringing in the air.

The documentation is designed to be both informative and speculative. While many of the details are spelled out explicitly, a few need serious contemplation.

The excellent graphics and sound, combined with a creative plot, make this a good game to occupy an afternoon. With seven (or more) levels to overcome and a meaner dragon and more complex tunneling scheme in each one, it's doubtful that you'll be satisfied with an afternoon's play. Give this one a look. If you enjoyed Rescue on Fratalus, the Eidolon is likely to appeal to you as well. (And specially marked boxes contain entry forms for a contest whose first prize is a trip to Lucasfilm.)

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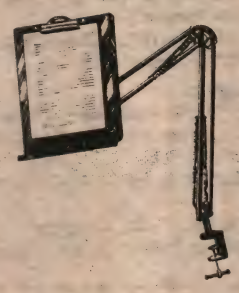
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the 64. The "Calc" and "Writer" programs are so much improved over the C-64 versions that it's hard to believe they are from the same company! I haven't seen the "Data Manager-128" program, but if its as good as the others, it should be an excellent choice for your C-128. The programs I saw, used the "pull-down menus" like an Amiga or Mac. The speed and ease of use was very good. I would recommend both "WordWriter-128" and "SwiftCalc-128" over the "Jane" programs that Commodore is selling. (It's nice to see a company improving its products.)

Kwik-Write - Where You Been All My Life?

It amazes me how far "home computer" wordprocessing software has come in such a short time. Two years ago I bought "Quick Brown Fox" for my VIC-20 for $69.95... (and I was glad to get it for that price)! That was one of the first "real" wordprocessors widely available for the VIC-20. "QBF" was a strange combination of a line and screen editor with strong formatting commands, but excruciating editing.

Then, I got my C-64 and Easy Script...WOW! It was like entering the 20th Century. Not only was there good formatting, but also full screen editing and revision. (It also worked with the cheap Centronics interface). It did have a couple of little problems, though. All my old "QBF" text files were saved in PRG (program) format. Easy Script only understood SEQ files. So, I had to write a conversion routine in BASIC to read in all my old QFB PRG files and turn them into SEQ form... Now all my files were converted (yea!)...

After using Easy Script for a while, some shortcomings started to appear that became more than just minor annoyances. First, it took just a little less than forever to load. (The promised ROM cartridge version of Easy Script never appeared, to my knowledge.) Second, it didn't have "word-wrap" when editing. Sometimes you would find line breaks printed differently than they appeared on the screen because of this. Third, even though it was faster than using QBF and a cassette deck on my VIC, long text files took longer than forever to save or load.

So, about that time appeared the infamous "SpeedScript" program from *COMPUTE!* Not only did it load much quicker than E.S., it had word-wrap editing, and seemed to save and load files a little faster. When used with a disk speed-up program, its performance became almost acceptable. The hitches...files are PRG format again...SEQ not allowed... (where's that old utility program?)...And, there's no real "preview" mode like Easy Script has. (Booooo!)

More than once, I was tempted to start coding a stand-alone text editor that would solve some of these problems...but time kept me from ever completing it.

Enter Kwik-Write - Most Versatile C-64 Wordprocessor Ever?

I have reviewed Datamost's "Kwik-Load" disk speed-up utility for the Commodore 64, in a previous *COMPUTER SHOPPER*. As noted in that earlier review, Datamost has begun to release a full line of software packages based on the "Kwik-Load" concept. "Kwik-Write" is the "Kwik" wordprocessing program from Datamost. All the "Kwik" programs are retailing at $19.95. Yet, the quality of the software is often (but not always) far above the price range they fall into.

Kwik-Write, has a lot in common with both Easy Script and SpeedScript. It incorporates the best features on both programs and adds a few of its own. After using Kwik-Write, I think you will find that it overcomes just about every shortcoming of the above programs. And it does it in style, at a price that's almost impossible to beat. For the skeptics out there who won't take my word for it, here (as Joe Friday used to say) are "just the facts." I have included a table of benchmark tests that compares various performance differences between Kwik-Write, Easy Script, and SpeedScript. Overview.

Kwik-Write runs on the Commodore 64, SX-64, or a C-128 in the "64" mode. You also need a 1541 or 1571 disk drive (No, it doesn't work with tape. Yes, it runs on the 1571 ok). For a printer, you can use either a standard Commodore model, a "serial bus interfaced" non-Commodore, an RS-232 interface on the User Port, or (like Easy Script) a parallel printer on the User Port. Our cheap User Port parallel interface has to be modified slightly to work with Kwik-Write (details a little later).

Excellent Price/Performance Ratio

After using Kwik-Write for some time, I feel it's an excellent wordprocessor, with a fantastic price/performance ratio. I have been a devoted Easy Script fan for a couple of years. I've cranked out a lot of text using it and SpeedScript. Well, Kwik-Write has them both beat in my opinion. If you don't yet have a stand-alone wordprocessor for your C-64, Kwik-Write deserves serious consideration. (Unfortunately, the companion program from Datamost, "Kwik-Spell," isn't as well done. I can't recommend it, even at its low price.) Now, if Datamost can get the program running on the C-128 mode, it will be almost perfect.

Here, in a nutshell, is what I like "Kwik-Write:"

-Full featured (edit, formatting, printing options)
- User friendly (built-in "Help" screens)
- Fast editing, scrolling, search/replace
- Very flexible file handling (PRG, SEQ, or USR files)
- Built-in disk speed-up routines to make disk access up to 300% faster.
- Low cost (under $20)!
-Works with cheap User Port Parallel Interface (with some minor mods)
- User selectable character set when editing

The main limitations are:
- Copy protected disk (but it doesn't "bump").
- No support of 80 column display in software or hardware.
- Limited support from

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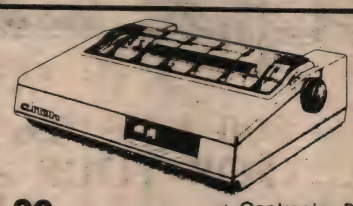
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Rescue On Fractalus

by Cheryl Peterson

Lucasfilms, Ltd. has found a way to put high resolution moving (three-dimensional) background into their games and the effect really works. Coming from one of the special effects experts of all-time, how could you expect less. And like the movies Lucasfilms has put together, Rescue on Fractalus has an action-packed plot.

As a pilot of a Valkyrie fighter, you must swoop down to the planet below and rescue other pilots trapped on the surface. A homing device will get you within range. You must land, turn off your shields, open the airlock to let the pilot in, reactivate your shields once the pilot is inside and get off the planet's surface before the enemy gun emplacements zero in on your fighter and blast you to bits. Sounds simple, doesn't it?

Well, there are enemy saucers just waiting to get their lasers on you. And if you aren't fast enough, they may even make a Kamikaze run at you and knock you out of the fight with one hit. Normally your shields can withstand several laser hits from saucers and ground based lasers. You have a limited fuel supply that is eaten up each time the shields take a direct hit.

If that isn't enough, enemy flyers will take over any of your ships left on the surface without a pilot in them. So be wary! The approaching pilot may be an alien. If you land with the ship in sight through your viewport, you'll easily be able to tell the difference. It's a good idea to destroy the pilot's ship after you pick him up. This lessens the chances of aliens luring you or your fellow rescuers into a trap.

The instrument display panel is great. Similar to an airplane's cockpit, the control panel has altitude and fuel gauges, air speed, direction, velocity, wing clearance and artificial horizon indicators. There are two targeting scopes; one for coarse aim, one for fine.

Since the Valkyries are limited range fighters, getting back to the mothership is a prime concern. An indicator is provided to let you know when the mothership comes back into range. Knowing when to return to the ship for refueling is an important skill. Although extra points are given for picking up pilots in excess of your quota, the points won't do any good if you (and they) are dead. One indicator lets you know how many pilots you've picked up and how far off you are from the quota. Some of the pilots are aces. Picking one of them up and returning with him wins a whole bunch of extra points.

Your control panel also tracks how many of the enemy you do away with. This total includes saucers destroyed and aliens fried. Yes, if you notice that the flyer you're picking up is an alien, you can turn your shields back on after he gets in range. (If you don't, he'll plant a bomb under you and blow ya to smithereens.)

The documentation for Rescue on Fractalus is colorful and helpful. The illustrations are very well done, making you feel like you're part of the story. The Valkyries are almost dead ringers for US Air Force SR-71 Reconnaissance plane. (Although the SR-71 has cameras, not laser cannons.)

I found Rescue on Fractalus a fun game, slightly frustrating (until I got the controls mastered). If you enjoy a good Star Wars(tm) style shoot 'em up, you'll love Rescue on Fractalus.

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Hands ON!
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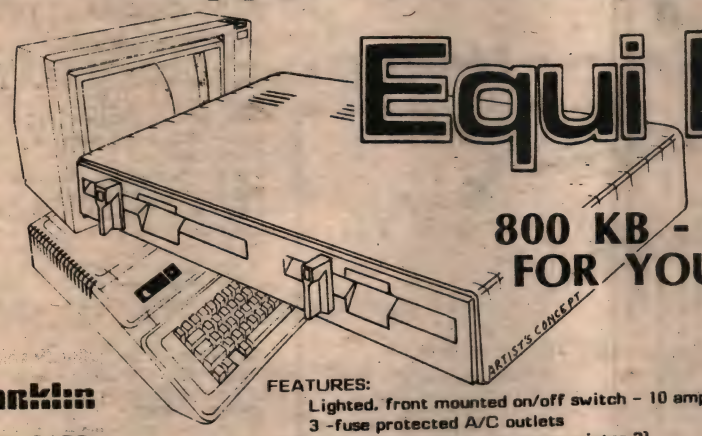
If you're on a budget, you might look at Commodore's other monitor, the 1902. This is the one that's "officially" for the C-128. But an informal side-by-side comparison between the two models didn't reveal any obvious differences other than minor cosmetics. Some claim that they are the exact same monitor with only a sticker on the front being different. Since the 1902 is running for $250 or so at discount, and the Amiga monitor is selling for $500 at retail, you might buy the 1902 if you can stand having "Commodore" and not "Amiga" on the front panel of the monitor. (By the way, don't expect your Amiga dealer to either know this or tell you about it.)

Of course you can also use any "digital" RGB monitor on the market (like Princeton Graphics, Amdek, or Taxan) and be limited to 16 colors. But, they are certainly better than a color TV set and RF modulator! If the monitor is set up for an IBM-PC (most are), you will have to get or make a special cable to hook it up to your Amiga, using a different connector than the PC. The Amiga uses a DB-23 connector instead of a DB-9. The appropriate pinouts are found in the back of the User's Manual.

If you're on a very low budget, you can hook your Amiga up to a TV set (through an RF modulator) or a composite monochrome monitor. But, I'd wait until I could get an RGB monitor. I mean, the hi-res color graphics are more than half of what the Amiga system is all about, anyway.

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Great American continued from page 128

be a pain. (And as the other cars whiz by, it's also frustrating!) To avoid running out of gas, you'll have to stop periodically to fill up. Gas stations are spaced about 100 miles apart.

The dashboard indicators are quite realistic. You've got a speedometer, tachometer and clock available. Other readouts make important numbers immediately available. In fact, the dashboard includes several other timing related indicators. One shows the time elapsed so far in the race, another the time for the present leg of the trip.

A countdown clock starts at the beginning of each leg and shows the amount of time left to reach the next stop on your journey. This reflects the fastest time of the slowest competitor in the race. To avoid disqualification, you must beat this time. When the clock reaches zero, you're disqualified and the race ends. As this clock approaches zero, a warning beeper counts down the final seconds.

Another "countdown" device is the miles left to reach destination. Using the numbers on these two indicators, you can figure out how fast you've got to go to get there in time. If you've got more than 100 miles to go and less than an hour to get there, you better be doing more than 100 miles an hour or you'll never make it.

One important dashboard accessory is your radar detector. When there's a "bear" ahead with his radar on, your warning sounds loud and clear. It continues to clang until you pass the offending cop's car. But be careful you don't go by too fast, unless you think you can outrun him, that is. Being stopped results in a ticket, which you have to wait to receive. While you wait, you're losing precious time. In order to win the race, you've got to average more than 140 miles per hour, so you don't have time to be wasting chatting with law enforcement officials.

The scenery for this game is amazing. The road races along in time to your speed. In most cases, the scenery has enough identifying elements to make it interesting. Road signs, cactus, barns, trees, piles of snow and other features dot the landscape. Icy road conditions accompany the snow drifts, so you have to watch out for skids. Wet roads contain slippery patches, as well.

Unfortunately, for an experienced road hopper like me, a few inconsistancies really stood out. All the roads appear to be flat. Sorry guys! If you've ever taken the route from Salt Lake City to Denver, you

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Inside Commodore continued from page 129

manufacturer (but still better than Commodore).

In my opinion, the advantage far outweigh the limitations, especially considering the price.

Booting Up

Kwik-Write comes on the typical Datamost protected disk. The disk is copy protected, but 1) it doesn't "bump" when loading, and 2) Datamost will send you a back-up if you send in your registration and $10. This back-up policy is not the brain-damaged one Commodore used to try. The old Commodore back-up policy probably did more to sell disk copy programs than anything I can think of. With that policy, if you had a bad master disk, you had to send it back to Commodore (along with $5) before they would send you a replacement. Just what you were supposed to do for a wordprocessor in the meantime was your problem. As a result, many people found ways to make their one legal back-up copy, without Commodore's help. Datamost, on the other hand, sends you a back-up disk *before* you need it. Somehow I think they have a better understanding of why people want back-ups in the first place!

Those who have used Easy Script will recall the long boot time it takes to get the program up and running. Well, Kwik-Write boots in about half the time, just a little over 30 seconds by my watch. If it didn't load a fancy hi-res sign-on screen, it would probably load even faster. It takes 22 seconds to load the hi-res screen and about 10 seconds to load the program! Anyway, it's still probably faster than what you're used to.

The character set that appears on the screen while editing is soft-loaded from disk at boot up time. From the main menu, you can choose one of four fonts that will be loaded when booting. I liked the smaller character set (called "small"). The "standard" set reminded me of the IBM-PC character set (real descenders, etc.) Two other set ("space" and "stop") were highly stylized and might appeal to some.

Editing

Kwik-Write is a full screen editor, with all the standard, insert, delete, copy, move, search, and replace commands. Only 40 columns are visible on the screen, but you can set up to 132 "virtual columns" that will allow you to "side scroll" when you reach the end of a screen line and continue to edit (just like Easy Script). Screen scrolling is fast. The global search and replace commands are lightning fast.

The program is menu-driven and delivers reasonable error messages. Unlike the massive manual that comes with Easy Script, Datamost only provides a 20 page User Manual and a support line number. Yet, since the program is so user-friendly, that's all that's required. While in the edit mode, a simple "Commodore-?" keystroke pulls up a three-page command summary help file. After just a short time, you can "go it alone" with just those help screens and never refer to the printed manual again.

For cursor movement, Datamost allows the normal cursor keys, and an almost Wordstar-like "diamond." By using the "Commodore" key as a control key, you can use the "E," "S," "D," and "C" keys to manuever around the screen. For WordStar users who also

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Hands ON!
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Anything less than an RGB monitor on an Amiga is like training wheels on an F-15 fighter. Why hold back the potential if you're going all out? It defeats the purpose.

As a final note on the Amiga monitor, the initial specs for it included a stereo audio amp. Well, it ain't there. You only get mono. You have to use a "Y" connector to get both channels hooked up to the mono amp. Of course you can hook the two Amiga sound output channels up to your stereo and skip the wimpy little monitor speaker, anyway. That's probably the best thing to do.

RAM Galore (But Is There Ever "Enough?")

As you've heard, Commodore has reserved over 8 Megabytes in the Amiga for internal and expansion RAM. The standard Amiga comes with 256K of usable RAM on the motherboard. Another 256K can be added through an expansion card for a total of 512K.

With the standard 256K RAM, 80K or so is usually taken up by AmigaDOS, the disk operating system. Also, the Amiga's video chips can only access into the first 512K of RAM, so all graphics and display memory have to be there too. In a 256K machine, things start to get tight real quick. You will usually have a lot less than 190K left for programming, especially when running animated graphics. For this reason, most of the fancy graphic demos for the Amiga need 512K to run.

Apparently, when the extra 8 Megabytes of RAM becomes available, you'll be able to move your program code to that expansion RAM and leave the lower 512K in the machine open for graphics. When, and if, this happens, many Amigas will have more RAM in them than a lot of minis and mainframes do right now. (And Commodore is rumored to be looking at a 54 Megabyte bank switching scheme!)

If you are doing software development, you should consider getting the extra 256K at purchase time (a $200 option). If you aren't writing fancy graphics programs yet, that extra RAM can also be put to use as a RAMDisk. The needed software is already built into AmigaDOS. Using a RAMDisk speeds up the operations of the Amiga considerably.

Documentation and Price — The Downfall of a Hero?

So, while the Amiga has a lot going for it, and I do mean a lot, it also has some temporary (I assume), but serious shortcomings. Like a shortage of available application software, little technical documentation (remember, this is a real production model I saw, not a "for review" prototype), and a price that will keep it out of traditional Commodore markets (for a while). As long as these shortcomings are not addressed by Commodore, I think the Amiga will be a slow seller, and an apparent flop to "outsiders" (i.e. those who aren't Commodore "true believers").

The high price, especially, will be a hindrance, because the Amiga is going to experience head to head competition (and comaprison) with a computer from Commodore's life-long nemesis, Atari. The Atari 520ST doesn't quite have all the sophistication of the Amiga. But it has a fair amount of it. That may be enough to sell it to those who "want an Amiga" but will "settle for an Atari." The same technique worked well with a lot of people who bought a Commodore 64 instead of an Apple II. In my opinion, the Atari will have the marketing edge as long as there is a price difference between the two of several hundred dollars (currently it's closer to $1000 difference).

So, I hope and expect Commodore to get the price of the base unit under $1000 in the next year. When that happens, sales will pick up and the software will flow. Until then, expect to hear more success stories about the Atari than the Amiga.

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Inside Commodore continued from page 132

use Commodore this is a welcome feature. Why Datamost didn't use the full WordStar diamond (using the "X" key instead of the "C" for cursor down)? I don't know. I wish they would have. The ability to use one hand to scoot around is still there, but veteran WordStar users will have to re-learn a little bit. You can use a joystick in Port I for cursor movement, like Easy Script.

File Handling

All disk operations of Kwik-Write are automatically faster (at least 300% over normal) due to the use of the Kwik-Load algorithyms in the software. Table #1 compares the performance differences between the three programs and tells its own story.

Another big advantage of Kwik-Write over other programs is its ability to handle any type of file format. Text files can be read in that are in PRG, SEG, or *even USR format*, with no problem. So, no matter what you've been using for a word processor before you can use "Kwik-Write" to edit and print them (of course the embedded format commands might have to be changed to work correctly).

You can also toggle the "cursor mode" of a file. Some text files are saved as true ASCII. Other use the more common "PETSCII" format. If you read "foreign" text files into some word processors, all the upper case letters will display as lower case and vice-versa. The cursor mode determines which characters will be upper or lower case. With "Kwik-Write," you can switch between one or the other instantly, so this problem is eliminated.

When saving text, the saved format can be different from the input file. An output file can be any of the above forms also. This makes it easy to convert a text file from one format to another. Simply load it in with whatever format it's currently in and then save it as the desired format.

Many of the file maintenance commands of "Kwik-Load" are available in "Kwik-Write." You can Scratch and Rename files with menu drive help. The fast format option of "Kwik-Load" is also present. This allows you to format a blank floppy disk in less than 15 seconds. There is also the options of toggling auto-Verify on and off. Auto-

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Performance Comparison
(All times in Min: Sec format)

	Kwick-Write		Easy Script	Speed Script
Time to Boot from Disk	00:33		01:03	00:15
Load a Sequential File	00:02	(3 blocks)	00:04	-------
	00:07	(21 blocks)	00:16	-------
	00:16	(84 blocks)	00:55	-------
Load a Program File	00:02	(3 blocks)	-----	00:04
	00:06	(21 blocks)	-----	00:16
	00:16	(84 blocks)	-----	00:56
Save a Sequential File	00:05	(3 blocks)	00:06	-------
	00:08	(21 blocks)	00:20	-------
	00:16	(84 blocks)	01:09	-------
Search and Replace 350 Time	00:03		06:24	-----

Table #1 - Speed Comparison

Great American continued from page 132

know that it's mountainous terrain at either end with a lot of flat grassland in between. No one does those mountains at more'n a hundred miles per hour. Not even Greyhound! The Seattle to Salt Lake route also should have a few mountains in the middle. And where are the Blue Ridge and Catskill mountains?

Another thing that bothered me was the lack of wildlife. Where are the deer and the antelope? We're talking Rockies here, with no Rocky Mountain Big Horn Sheep. Farms with no horses, cows or sheep, even. And forget seeing anything remotely human, hitchhiking along the road. (Of course, hitchhiking isn't a healthy way to travel, these days.)

The race eliminates all the time that would be spent negotiating city traffic. I guess the authors figured drivers would use the bypasses to avoid downtown congestion. This also means though, that you're avoiding digestion and sleep. Although the daylight simulation helps reinforce the length of time a cross country trip can take, it would be nice if drivers stopped to eat occasionally. When you bypass the cities, you also bypass their gas stations, so you must always fillup while you're out on the road.

There are a couple of frustrating details. Backing up doesn't seem to be a possibility, which means you can't reverse direction to get back to the gas pump you just shot past. If you blow your engine or run out of gas, you have to push your car to a gas station. (But then, you deserve it for neglecting your car!)

You must avoid hitting other cars to make good time. A collision causes a spin out, which reduces your speed and forces you to work your way back up to fourth gear. There doesn't appear to be anything you can do to cause a fatal crash. Even colliding with a big truck only slows you down temporarily. The sound when passing another vehicle is realistic and adds a nice touch.

I really enjoyed playing Great American Road Race. Even at 200+ miles per hour the program still keeps up with you. (It's difficult to avoid hitting the competition at such speeds, but you can travel that fast.) Since the other drivers average close to 140 miles per hour, it isn't easy to beat them. When you first complete the trip and get there all in one piece, it's a nice feeling even if you're in last place.

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TURBO PASCAL	IBM only	n	n	Y	$69.95	optional	Y
CBASIC2	n	n	n	n	$600.00	n	n
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Inside Commodore
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Verify does an automatic "read after write" for all disk operations. This is an extra check for data integrity.

Formatting the Text

The usual host of embedded formatting commands is available in Kwik-Write. Disk file merge ("mail merge") is also built-in. I found the formatting to be about as good as Easy Script and SpeedScript. Line spacing, page size, margins, headers and footers are all adjustable. Datamost has provided for the possibility of setting double strike, expanded print, and bold face directly through the use of formatting commands. Unfortunately, these commands only work with 1525 or compatible printers. To use any other printer, you either need an interface that translates for the "foreign" printer or you have to use the more primitive "character code" commands.

In the "Kwik-Write" manual, there is reference to other printer drivers being provided on the companion "Kwik-Spell" disk. Well, there ain't none there. And Datamost told me (over their support line), that they don't plan to implement any more driver, either. It seems most people are happy with the 1525 commands. There are no directions on how to write your own custom printer drive either (but I have discovered part of the process...it is very involved). This is one minor shortcoming of the program.

Printing

Kwik-Write support serial bus printers, RS-232 printers, and parallel port printers. Serial bus printers may be either device #4 or #5. You can set all the RS-232 parameters from within the program and the manual gives you all the information on how to do it.

Since I am fond of using the User Port for a parallel printer, I was glad to see it supported on the Kwik-Write main menu, But, when it came time to print, I could get no output to my RX-80,...bummer! I called Datamost, for help. They were courteous, but couldn't provide much help. It seems that Kwik-Write's main programmer has departed the company and he is the one who developed the print routines, they did say that they had tested the program thoroughly and the parallel option did work, but they couldn't give me the interface connections.

After much trial and error, I finally did discover the pinouts. With some minor resoldering, the Centronics interface from the August *COMPUTER SHOPPER* works fine.

In case you want to hook up the interface to Kwik-Write, here's the correct pinouts:

As you will notice, this is different from out connections for either Easy Script or our generic driver program. If you plan on using the interface with a lot of different software, you might rig up a switch to handle both pinouts.

Next month, I'll be reviewing more new Commodore products and maybe even some on the Amiga. Keep those cards and letters coming, we want to provide the information you need and want. ●

User Port	Useage	Centronics Interface
C - L	Data 0-7	3 - 9
M	Busy	11
8	Strobe	1

Hands ON!
continued from page 133

By the way, in case you're interested, here's what a "real" Amiga costs:

Amiga System Box/keyboard /Mouse w/one drive and 256K RAM $1295.00
Amiga color monitor $495.00
256K RAM Expansion$195.00
Total $1985.00

That's almost two grand for a system with no printer and precious little software! We aren't talking about a little game machine for the kids anymore. Trying to get a discount on this thing is useless. The demand is still too high.

Development Package — Promises From Pennsylvania

If you are lucky enough to get the "Developer's Package," a lot of the documentation problems will be solved. There may be some errata to contend with, but at least you won't spend hours (like we did) trying to discover the right syntax for CLI commands. For the record, here's what you get with the developer's package:

The Software:

The Standard Software Disks - (KickStart, Workbench, ABasiC)
Lattice C native compiler
Lattice C IBM-PC cross compiler
68000 Macro Assembler
WACK Utilities - (Debugger, etc.)

The Books:

AmigaDOS User's Manual - (This one is the most elusive of the bunch)
Amiga Hardware Manual
Intuition Manual
Amiga ROM Kernal Manual
Lattice C Compiler Manual

If you already have the Amiga, you can get all the above for $250 (rumor) from Commodore. If you don't have an Amiga, they sell you the whole package, with computer, for $2000. The waiting period is from 6 weeks to several months. Good luck trying to get one.

If you are willing to be a pioneer and take a risk, becoming one of the first Amiga owners might pay off. If you can stand the lack of software and documentation, the arrogant attitude of Commodore towards average Amiga owners, and the reproach of being a non-conformist, you may find that mastering one of the most powerful personal computers ever built (if not the most powerful) can be an exhilarating experience. There's a lot of power in that little box and the challenge is great. The potential rewards, of course, are even greater.

(P.S. If you are already an Amiga owner looking for answers to some of your questions, feel free to write me c/o the *COMPUTER SHOPPER*. I'll try my best to help you. Another excellent source of information is the Delphi subgroup "Starship Amiga." New Amiga discoveries are being reported there on a daily basis.) ●

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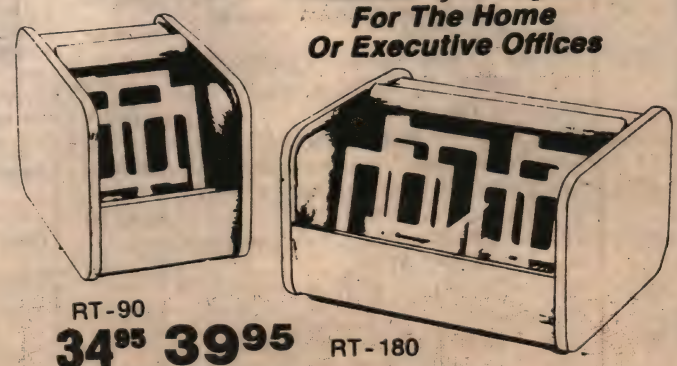
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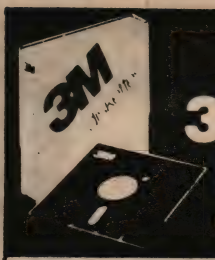
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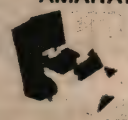
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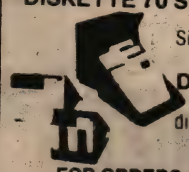
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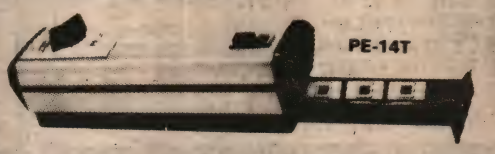
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6803	9.95
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6820	2.95
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6847	11.95
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6883	22.95

2.0 MHz

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68B09	7.95
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3.579545	1.95
4.0	1.95
4.032	1.95
5.0	1.95
5.0688	1.95
6.0	1.95
6.144	1.95
6.5536	1.95
8.0	1.95
10.0	1.95
10.738635	1.95
12.0	1.95
14.31818	1.95
15.0	1.95
16.0	1.95
17.430	1.95
18.0	1.95
18.432	1.95
20.0	1.95
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24.0	1.95
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1.0MHz	5.95
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2.0	5.95
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2.5	4.95
4.0	4.95
5.0688	4.95
6.0	4.95
6.144	4.95
8.0	4.95
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74LS00

74LS00	.16	74LS165	.65
74LS01	.18	74LS166	.95
74LS02	.17	74LS169	.95
74LS03	.18	74LS173	.49
74LS04	.16	74LS174	.39
74LS05	.18	74LS175	.39
74LS08	.18	74LS191	.49
74LS09	.18	74LS192	.69
74LS10	.16	74LS193	.69
74LS11	.22	74LS194	.69
74LS12	.22	74LS195	.69
74LS13	.26	74LS196	.59
74LS14	.39	74LS197	.59
74LS15	.26	74LS221	.59
74LS20	.17	74LS240	.69
74LS21	.22	74LS241	.69
74LS22	.22	74LS242	.69
74LS27	.23	74LS243	.69
74LS28	.26	74LS244	.69
74LS30	.17	74LS245	.79
74LS32	.18	74LS251	.49
74LS33	.28	74LS253	.49
74LS37	.26	74LS256	1.79
74LS38	.26	74LS257	.39
74LS42	.39	74LS258	.49
74LS47	.59	74LS259	1.29
74LS48	.69	74LS260	.49
74LS51	.17	74LS266	.39
74LS73	.29	74LS273	.79
74LS74	.24	74LS279	.39
74LS75	.29	74LS280	1.98
74LS76	.29	74LS283	.59
74LS83	.49	74LS290	.89
74LS85	.49	74LS293	.89
74LS86	.22	74LS299	1.49
74LS90	.39	74LS322	3.95
74LS92	.49	74LS323	2.49
74LS93	.39	74LS364	1.95
74LS95	.49	74LS365	.39
74LS107	.34	74LS367	.39
74LS109	.36	74LS368	.39
74LS112	.29	74LS373	.79
74LS122	.45	74LS374	.79
74LS123	.49	74LS375	.95
74LS124	2.75	74LS377	.79
74LS125	.39	74LS378	1.18
74LS126	.39	74LS390	1.19
74LS132	.39	74LS393	.79
74LS133	.49	74LS541	1.49
74LS136	.39	74LS624	1.95
74LS138	.39	74LS640	.99
74LS139	.39	74LS645	.99
74LS145	.99	74LS669	1.29
74LS147	.99	74LS670	.89
74LS148	.99	74LS682	3.20
74LS151	.39	74LS683	3.20
74LS153	.39	74LS684	3.20
74LS154	1.49	74LS688	2.40
74LS155	.59	74LS783	22.95
74LS156	.49	81LS95	1.49
74LS157	.35	81LS96	1.49
74LS158	.29	81LS97	1.49
74LS160	.29	81LS98	1.49
74LS161	.39	25LS2521	2.80
74LS162	.49	25LS2569	2.80
74LS163	.39	26LS31	1.95
74LS164	.49	26LS32	1.95

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74HC00

74HC: Operate at CMOS logic levels and are ideal for new, all-CMOS designs.

74HC00	.59	74HC148	1.19
74HC02	.59	74HC151	.89
74HC04	.59	74HC154	2.49
74HC08	.59	74HC157	.89
74HC10	.59	74HC158	.95
74HC14	.79	74HC163	1.15
74HC20	.59	74HC175	.99
74HC27	.59	74HC240	1.89
74HC30	.59	74HC244	1.89
74HC32	.69	74HC245	1.89
74HC51	.59	74HC257	.85
74HC74	.75	74HC259	1.39
74HC85	1.35	74HC273	1.89
74HC86	.69	74HC299	4.99
74HC93	1.19	74HC368	.99
74HC107	.79	74HC373	2.29
74HC109	.79	74HC374	2.29
74HC112	.79	74HC390	1.39
74HC125	1.19	74HC393	1.39
74HC132	1.19	74HC4017	1.99
74HC133	.69	74HC4020	1.39
74HC138	.99	74HC4049	.89
74HC139	.99	74HC4050	.89

74HCT00

74HCT: Direct, drop-in replacements for LS TTL and can be intermixed with 74LS in the same circuit.

74HCT00	.69	74HCT166	3.05
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74HCT04	.69	74HCT193	1.39
74HCT08	.69	74HCT194	1.19
74HCT10	.69	74HCT240	2.19
74HCT11	.69	74HCT241	2.19
74HCT27	.69	74HCT244	2.19
74HCT30	.69	74HCT245	2.19
74HCT32	.79	74HCT257	.99
74HCT74	.85	74HCT259	1.59
74HCT75	.95	74HCT273	2.09
74HCT138	1.15	74HCT367	1.09
74HCT139	1.15	74HCT373	2.49
74HCT154	2.99	74HCT374	2.49
74HCT157	.99	74HCT393	1.59
74HCT158	.99	74HCT4017	2.19
74HCT161	1.29	74HCT4040	1.59
74HCT164	1.39	74HCT4060	1.49

74F00

74F00	.69	74F74	.79	74F251	1.69
74F02	.69	74F86	.99	74F253	1.69
74F04	.79	74F138	1.69	74F257	1.69
74F08	.69	74F139	1.69	74F280	1.79
74F10	.69	74F157	1.69	74F283	3.95
74F32	.69	74F240	3.29	74F373	4.29
74F64	.89	74F244	3.29	74F374	4.29

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4056	2.19	74C192	1.49
4060	.69	74C193	1.49
4066	.29	74C221	1.75
4069	.19	74C240	1.89
4076	.59	74C244	1.89
4077	.29	74C374	1.99
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4086	.89	74C917	8.95
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4094	2.49	74C923	4.95
14411	9.95	74C926	7.95
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7400/9000

7400	.19	74147	2.49
7402	.19	74148	1.20
7404	.19	74150	1.35
7406	.29	74151	.55
7407	.29	74153	.55
7408	.24	74154	1.49
7410	.19	74155	.75
7411	.25	74157	.55
7414	.49	74159	1.65
7416	.25	74161	.69
7417	.25	74163	.69
7420	.19	74164	.85
7423	.29	74165	.85
7430	.19	74166	1.00
7432	.29	74175	.89
7438	.29	74177	.75
7442	.49	74178	1.15
7445	.69	74181	2.25
7447	.89	74182	.75
7470	.35	74184	2.00
7473	.34	74191	1.15
7474	.33	74192	.79
7475	.45	74194	.85
7476	.35	74196	.79
7483	.50	74197	.75
7485	.59	74199	1.35
7486	.35	74221	1.35
7489	2.15	74246	1.35
7490	.39	74247	1.25
7492	.50	74248	1.85
7493	.35	74249	1.95
7495	.55	74251	.75
7497	2.75	74265	1.35
74100	2.29	74273	1.95
74121	.29	74278	3.11
74123	.49	74367	.65
74125	.45	74368	.65
74141	.65	9368	3.95
74143	5.95	9602	1.50
74144	2.95	9637	2.95
74145	.60	96S02	1.95

74S00

74S00	.29	74S163	1.29
74S02	.29	74S168	3.95
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74S05	.29	74S188	1.95
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74S153	.79	74S373	1.69
74S157	.79	74S374	1.69
74S158	.95	74S471	4.95
74S161	1.29	74S571	2.95

VOLTAGE REGULATORS

TO-220 CASE

7805T	.49	7905T	.59
7808T	.49	7908T	.59
7812T	.49	7912T	.59
7815T	.49	7915T	.59

TO-3 CASE

7805K	1.39	7905K	1.49
7812K	1.39	7912K	1.49

TO-92 CASE

78L05	.49	79L05	.69
78L12	.49	79L12	.69

OTHER VOLTAGE REGS

LM323K	5V 3A	TO-3	4.79
LM338K	Adj 5A	TO-3	3.95
78H05K	5V 5A	TO-3	7.95
78H12K	12V5A	TO-3	8.95
78P05K	5V 10A	TO-3	14.95

LINEAR

TL066	.99	LM733	.98
TL071	.69	LM741	.29
TL072	1.09	LM747	.69
TL074	1.95	LM748	.59
TL081	.59	MC1330	1.69
TL082	.99	MC1350	1.19
TL084	1.49	MC1372	6.95
LM301	.34	LM1414	1.59
LM309K	1.25	LM1458	.49
LM311	.59	LM1488	.49
LM311H	.89	LM1489	.49
LM317K	3.49	LM1496	.85
LM317T	.95	LM1812	8.25
LM318	1.49	LM1889	1.95
LM319	1.25	ULN2003	.79
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LM335	1.40	CA3081	.99
LM336	1.75	CA3082	.99
LM337K	3.95	CA3086	.80
LM338K	3.95	CA3089	1.95
LM339	.59	CA3130E	.99
LM340	see7800	CA3146	1.29
LM350T	4.60	CA3160	1.19
LF353	.59	MC3470	1.95
LF356	.99	MC3480	8.95
LF357	.99	MC3487	2.95
LM358	.59	LM3900	.49
LM380	.89	LM3909	.98
LM383	1.95	LM3911	2.25
LM386	.89	LM3914	2.39
LM393	.45	MC4024	3.49
LM394H	4.60	MC4044	3.99
TL494	4.20	RC4136	1.25
TL497	3.25	RC4558	.69
NE555	.29	LM13600	1.49
NE556	.49	75107	1.49
NE558	1.29	75110	1.95
NE564	1.95	75150	1.95
LM565	.95	75154	1.95
LM566	1.49	75188	1.25
LM567	.79	75189	1.25
NE570	2.95	75451	.39
NE590	2.50	75452	.39
NE592	.98	75453	.39
LM710	.75	75477	1.29
LM723	.49	75492	.79

H=TO-5 CAN, K=TO-3, T=TO-220

DATA ACQ INTERFACE

ADC0800	15.55	8T26	1.29
ADC0804	3.49	8T28	1.29
ADC0809	4.49	8T95	.89
ADC0816	14.95	8T96	.89
ADC0817	9.95	8T97	.59
ADC0831	8.95	8T98	.89
DAC0800	4.49	DM8131	2.95
DAC0806	1.95	DP8304	2.29
DAC0808	2.95	DS8833	2.25
DAC1020	8.25	DS8835	1.99
DAC1022	5.95	DS8836	.99
MC1408L8	2.95	DS8837	1.65

IC SOCKETS

	1-99	100
8 PIN ST	.13	.11
14 PIN ST	.15	.12
16 PIN ST	.17	.13
18 PIN ST	.20	.18
20 PIN ST	.29	.27
22 PIN ST	.30	.27
24 PIN ST	.30	.27
28 PIN ST	.40	.32
40 PIN ST	.49	.39
64 PIN ST	4.25	CALL
ST=SOLDERTAIL		
8 PIN WW	.59	.49
14 PIN WW	.69	.52
16 PIN WW	.69	.58
18 PIN WW	.99	.90
20 PIN WW	1.09	.98
22 PIN WW	1.39	1.28
24 PIN WW	1.49	1.35
28 PIN WW	1.69	1.49
40 PIN WW	1.99	1.80
WW=WIREWRAP		
16 PIN ZIF	4.95	CALL
24 PIN ZIF	5.95	CALL
28 PIN ZIF	6.95	CALL
40 PIN ZIF	9.95	CALL
ZIF=TEXTOOL (ZERO INSERTION FORCE)		

EDGECARD CONNECTORS

100 PIN ST	S-100	.125	3.95
100 PIN WW	S-100	.125	4.95
62 PIN ST	IBM PC	.100	1.95
50 PIN ST	APPLE	.100	2.95
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44 PIN WW	STD	.156	4.95

36 PIN CENTRONICS

MALE

IDCEN36	RIBBON CABLE	6.95
CEN36	SOLDER CUP	4.95
CEN36PC	RT ANGLE PC MOUNT	4.95

FEMALE

IDCEN36/F	RIBBON CABLE	7.95

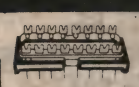
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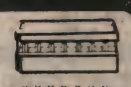
ICL7106	9.95
ICL7107	12.95
ICL7660	2.95
ICL8038	4.95
ICM7207A	5.95
ICM7208	15.95

DIP CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS 8	14	16	18	20	22	24	28	40
HIGH RELIABILITY TOOLED ST IC SOCKETS	AUGATxxST	.62	.79	.89	1.09	1.29	1.39	1.49	1.69	2.49
HIGH RELIABILITY TOOLED WW IC SOCKETS	AUGATxxWW	1.30	1.80	2.10	2.40	2.50	2.90	3.15	3.70	5.40
COMPONENT CARRIES (DIP HEADERS)	ICCxx	.49	.59	.69	.99	.99	.99	.99	1.09	1.49
RIBBON CABLE DIP PLUGS (IDC)	IDPxx	---	.95	.95	---	---	---	1.75	---	2.95

FOR ORDERING INSTRUCTIONS SEE D-SUBMINIATURE BELOW


ICC16


IDP14


AUGAT 24ST

DIODES/OPTO/TRANSISTORS

1N751	.25	4N26	.69
1N759	.25	4N27	.69
1N4148	25/1.00	4N28	.69
1N4004	10/1.00	4N33	.89
1N5402	.25	4N37	1.19
KBP04	.55	MCT-2	.59
KBU8A	.95	MCT-6	1.29
MDA990-2	.35	TIL-111	.99
N2222	.25	2N3906	.10
PN2222	.10	2N4401	.25
2N2905	.50	2N4402	.25
2N2907	.25	2N4403	.25
2N3055	.79	2N6045	1.75
2N3904	.10	TIP31	.49

D-SUBMINIATURE

DESCRIPTION		ORDER BY	CONTACTS 9	15	19	25	37	50
SOLDER CUP	MALE	DBxxP	.82	.90	1.25	1.25	1.80	3.48
	FEMALE	DBxxS	.95	1.15	1.50	1.50	2.35	4.32
RIGHT ANGLE PC SOLDER	MALE	DBxxPR	1.20	1.49	---	1.95	2.65	---
	FEMALE	DBxxSR	1.25	1.55	---	2.00	2.79	---
WIRE WRAP	MALE	DBxxPWW	1.69	2.56	---	3.89	5.60	---
	FEMALE	DBxxSWW	2.76	4.27	---	6.84	9.95	---
IDC RIBBON CABLE	MALE	IDBxxP	2.70	2.95	---	3.98	5.70	---
	FEMALE	IDBxxS	2.92	3.20	---	4.33	6.76	---
HOODS	METAL	MHOODxx	1.25	1.25	1.30	1.30	---	---
	GREY	HOODxx	.65	.65	---	.65	.75	.95

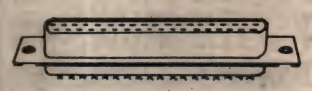
ORDERING INSTRUCTIONS: INSERT THE NUMBER OF CONTACTS IN THE POSITION MARKED "xx" OF THE "ORDER BY" PART NUMBER LISTED.

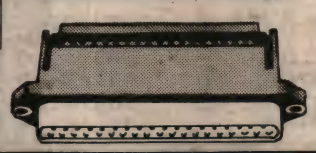
EXAMPLE: A 15 PIN RIGHT ANGLE MALE PC SOLDER WOULD BE DB15PR.

MOUNTING HARDWARE $1.00


MTG HDWR


HOOD25


DB37S


IDB37S

LED DISPLAYS

FND-357(359)	COM	CATHODE	.362"	1.25
FND-500(503)	COM	CATHODE	.5"	1.49
FND-507(510)	COM	CATHODE	.5"	1.49
MAN-72	COM	ANODE	.3"	.99
MAN-74	COM	CATHODE	.3"	.99
MAN-8940	COM	CATHODE	.8"	1.99
TIL-313	COM	CATHODE	.3"	.45
HP5082-7760	COM	CATHODE	.43"	1.29
TIL-311	4x7	HEX W/LOGIC	.270"	9.95
HP5082-7340	4x7	HEX W/LOGIC	.290"	7.95

DIFFUSED LEDS

		1-99	100-UP
JUMBO RED	T1¾	.10	.09
JUMBO GREEN	T1¾	.14	.12
JUMBO YELLOW	T1¾	.14	.12
MOUNTING HDW	T1¾	.10	.09
MINI RED	T1	.10	.09

SWITCHES

SPST	MINI-TOGGLE ON-ON	1.25
DPDT	MINI-TOGGLE ON-ON	1.50
DPDT	MINI-TOGGLE ON-OFF-ON	1.75
SPST	MINI-PUSHBUTTON N.O.	.39
SPST	MINI-PUSHBUTTON N.C.	.39
SPST	TOGGLE ON-OFF	.49
BCD OUTPUT 10 POSITION 6 PIN DIP		1.95

DIP SWITCHES

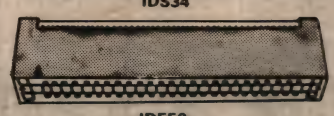
4 POSITION	.85	7 POSITION	.95
5 POSITION	.90	8 POSITION	.95
6 POSITION	.90	10 POSITION	1.29

IDC CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS 10	20	26	34	40	50
SOLDER HEADER	IDHxxS	.82	1.29	1.68	2.20	2.58	3.24
RIGHT ANGLE SOLDER HEADER	IDHxxSR	.85	1.35	1.76	2.31	2.72	3.39
WW HEADER	IDHxxW	1.86	2.98	3.84	4.50	5.28	6.63
RIGHT ANGLE WW HEADER	IDHxxWR	2.05	3.28	4.22	4.45	4.80	7.30
RIBBON HEADER SOCKET	IDSxx	.79	.99	1.39	1.59	1.99	2.25
RIBBON HEADER	IDMxx	---	5.50	6.25	7.00	7.50	8.50
RIBBON EDGE CARD	IDExx	1.75	2.25	2.65	2.75	3.80	3.95

FOR ORDERING INSTRUCTIONS SEE D-SUBMINIATURE ABOVE


IDS34


IDE50

RIBBON CABLE

CONTACTS	SINGLE COLOR 1'	10'	COLOR CODED 1'	10'
10	.18	1.60	.30	2.75
16	.28	2.50	.48	4.40
20	.36	3.20	.60	5.50
25	.45	4.00	.75	6.85
26	.46	4.10	.78	7.15
34	.61	5.40	1.07	9.35
40	.72	6.40	1.20	11.00
50	.89	7.50	1.50	13.25

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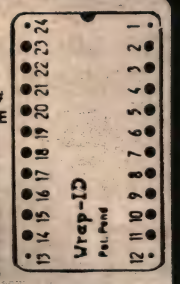
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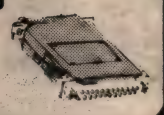


ID WRAP 24

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22	50V	.05	.001µf	50V	.05
27	50V	.05	.0022	50V	.05
33	50V	.05	.005	50V	.05
47	50V	.05	.01	50V	.07
68	50V	.05	.02	50V	.07
100	50V	.05	.05	50V	.07
220	50V	.05	.1	12V	.10
560	50V	.05	.1	50V	.12

MONOLITHIC

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.047µf	50V	.15	.47µf	50V	.25

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2.2	35V	.15	10	50V	.16
4.7	50V	.15	22	16V	.14
10	50V	.15	47	50V	.20
47	35V	.18	100	35V	.25
100	16V	.18	220	25V	.30
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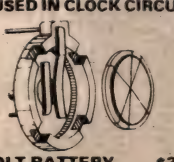
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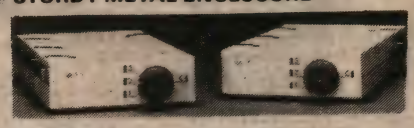
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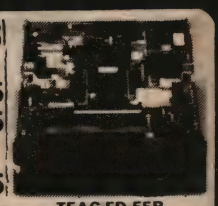
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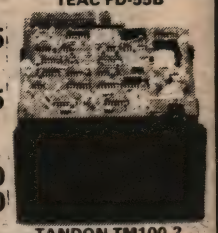
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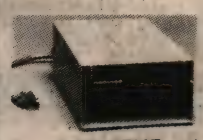
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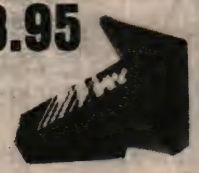
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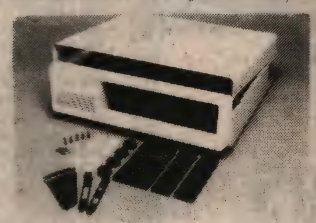
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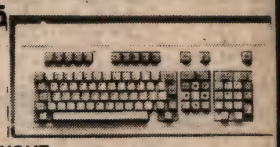


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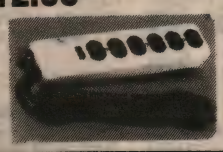
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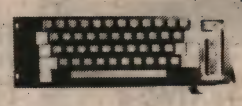
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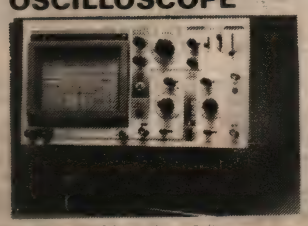


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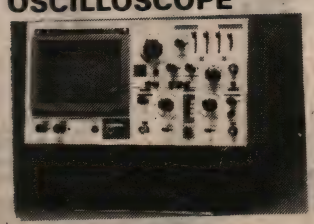


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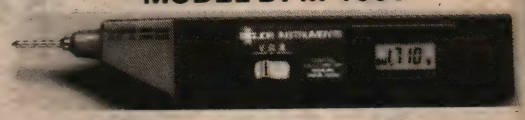
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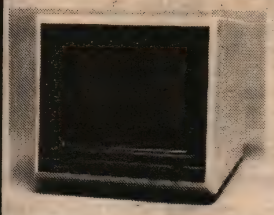


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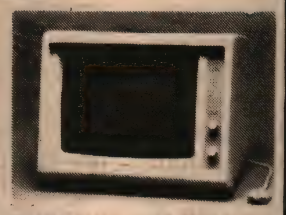


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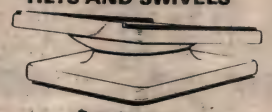
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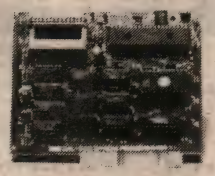
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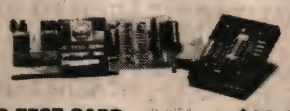
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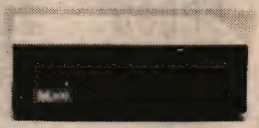
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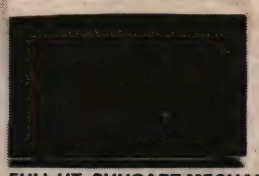
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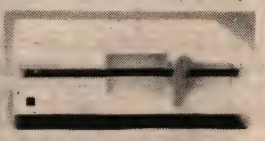
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Jackintosh continued from page 58

would give a more definite pixel representation.

The printer representation for a "1" is a filled character cell (decimal 95). Since the proportions on the printer are different than that of the screen, the icons will be extended vertically. This is not a handicap, since it allows more room for referencing individual bits and allows closer examination of bit-mapped techniques.

Bit-Mapping The System Font

The second program, FDUMP is set up to dump the standard 8x16 system font that starts at memory location 101027 decimal. Notice that the font is arranged in memory strips of 16 groups. Each group consists of a "scan line" of 8 bits representing a horizontal portion of a character. If we look at the top scan line in sequence, it would be each 8 bits across the top of the entire ASCII character set. When we reach the end of the first 8 bits of the top line, we return to the next scan line start address, (101027 + 256 = 101283) and there we can scan the next group of 8 bits just below the top line of the previous scan.

Since the paper we print on is only 8" wide, we can't print the entire top line scan of all 256 characters, so we divide it into 8 characters across the page. This means that we will print out the bitmap in sections of 64 bits across by 16 bits high. This works out to give us all 255 characters in sequence in a display that will be sensible and useful. (I hope!).

Note that this is set up for the 8x16 character set. If you wish to dump an 8x8, you will have to modify the program control counts suitably.

Interestingly enough, examination of the print outs show that you could still use only every other line of an 8x16 character set and still have a readable character set.

IDUMP Program

```
TO PARSE :A
 MAKE "B .EXAMINE :A
 MAKE "C1 INT (:B / 16)
 MAKE "C2 :B - (16 * :C1)
 BREAKUP :C1
 BREAKUP :C2
END

TO BREAKUP :CX
 IF (:CX = 0) [RUN :GR0 GO "Z]
 IF (:CX = 1) [RUN :GR1 GO "Z]
 IF (:CX = 2) [RUN :GR2 GO "Z]
 IF (:CX = 3) [RUN :GR3 GO "Z]
 IF (:CX = 4) [RUN :GR4 GO "Z]
 IF (:CX = 5) [RUN :GR5 GO "Z]
 IF (:CX = 6) [RUN :GR6 GO "Z]
 IF (:CX = 7) [RUN :GR7 GO "Z]
 IF (:CX = 8) [RUN :GR8 GO "Z]
 IF (:CX = 9) [RUN :GR9 GO "Z]
 IF (:CX = 10) [RUN :GR10 GO "Z]
 IF (:CX = 11) [RUN :GR11 GO "Z]
 IF (:CX = 12) [RUN :GR12 GO "Z]
 IF (:CX = 13) [RUN :GR13 GO "Z]
 IF (:CX = 14) [RUN :GR14 GO "Z]
 IF (:CX = 15) [RUN :GR15 GO "Z]
 LABEL "Z
 END

TO DGR0
 MAKE "GR0 [TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 95]
END

TO DGR1
 MAKE "GR1 [TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 223]
END

TO DGR2
 MAKE "GR2 [TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 95]
END

TO DGR3
 MAKE "GR3 [TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 223]
END

TO DGR4
 MAKE "GR4 [TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 95]
END

TO DGR5
 MAKE "GR5 [TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 223]
END

TO DGR6
 MAKE "GR6 [TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 95]
END
TO DGR7
 MAKE "GR7 [TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 223]
END

TO DGR8
 MAKE "GR8 [TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 95]
END

TO DGR9
 MAKE "GR9 [TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 95 TYPE CHAR 223]
END

TO DGR10
 MAKE "GR10 [TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 95]
END

TO DGR11
 MAKE "GR11 [TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 223 TYPE CHAR 223]
END

TO DGR12
 MAKE "GR12 [TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 95]
END

TO DGR13
 MAKE "GR13 [TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 95 TYPE CHAR 223]
END

TO DGR14
 MAKE "GR14 [TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 95]
END

TO DGR15
 MAKE "GR15 [TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 223 TYPE CHAR 223]
END

TO INITDMP
 DGR0 DGR1 DGR2 DGR3 DGR4 DGR5 DGR6 DGR7 DGR8
 DGR9 DGR10 DGR11 DGR12 DGR13 DGR14 DGR15
END

TO IDUMP :A
 MAKE "CNT 4
 TYPE :A
LABEL "ID2
 IF (:CNT = 0) [GO "ID4]
 PARSE :A
 MAKE "CNT :CNT - 1
 MAKE "A :A + 1
 GO "ID2
LABEL "ID4
 PRINT [ ]
 IDUMP :A
END
```

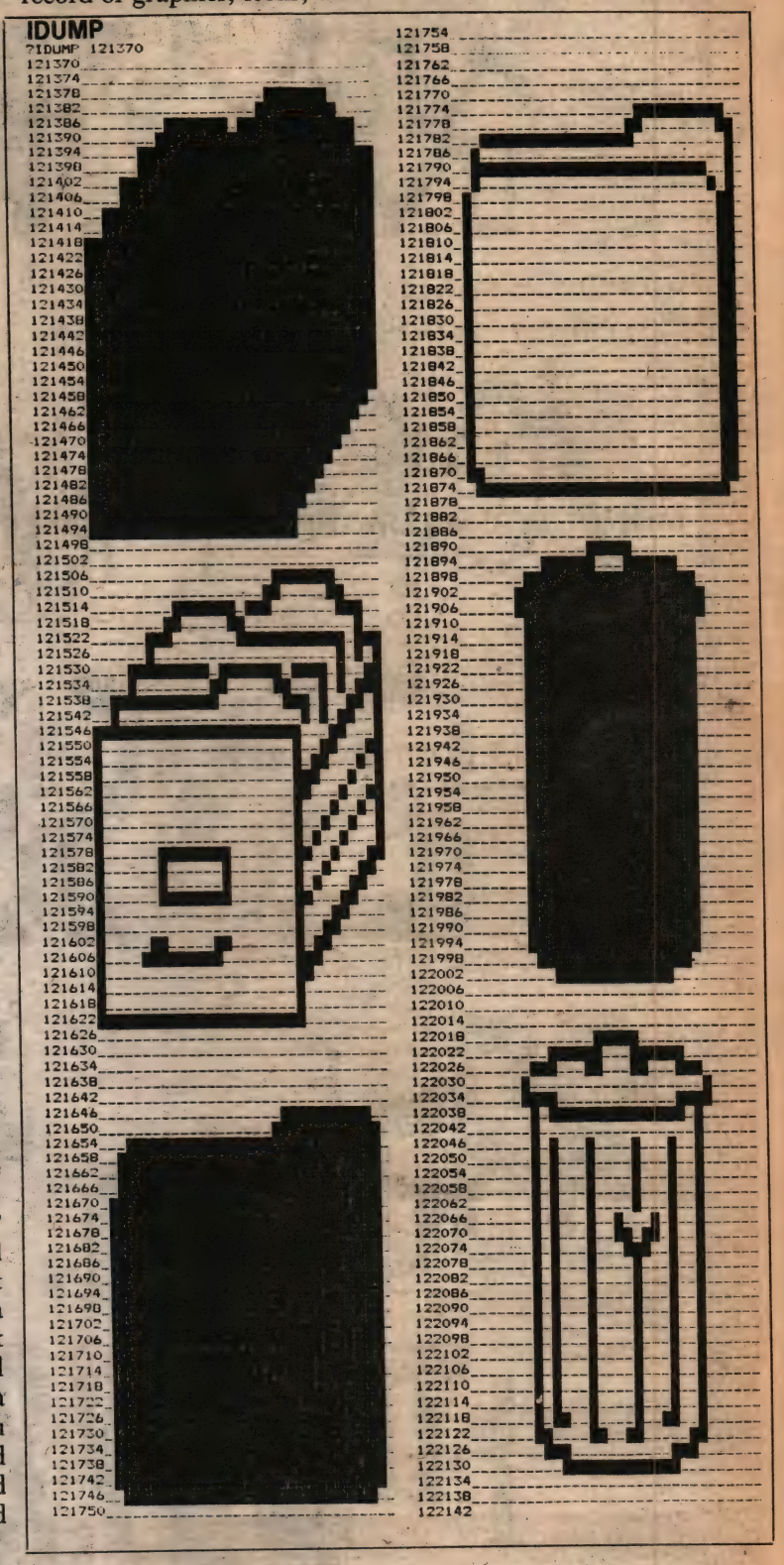
Comments

Type the Logo programs in as shown. Make sure that all typographical errors are resolved and then save them as "IDUMP.LOG" and "FDUMP.LOG."

When preparing to execute, be sure to run "INITDMP" first so that all the variables will have been defined before they are used.

If you want a darker copy on the Epson printer, precede your dump command with: TYPE CHAR 27 PRINT CHAR 71. This command makes the Epson double print everything so that you get a darker copy. Remember that the double print command will stay in effect until you send a new command or until you turn the printer power off and then on. Don't forget to send the COPYON command before you start your dump.

Bit map dumps can locate interesting patterns in memory and aid in troubleshooting. They also provide an achival record of graphics, icons, and font designs. If you have any ideas or comments, please send them to me at: Fred Hatfield, Box 52466, New Orleans, LA 70152. ●



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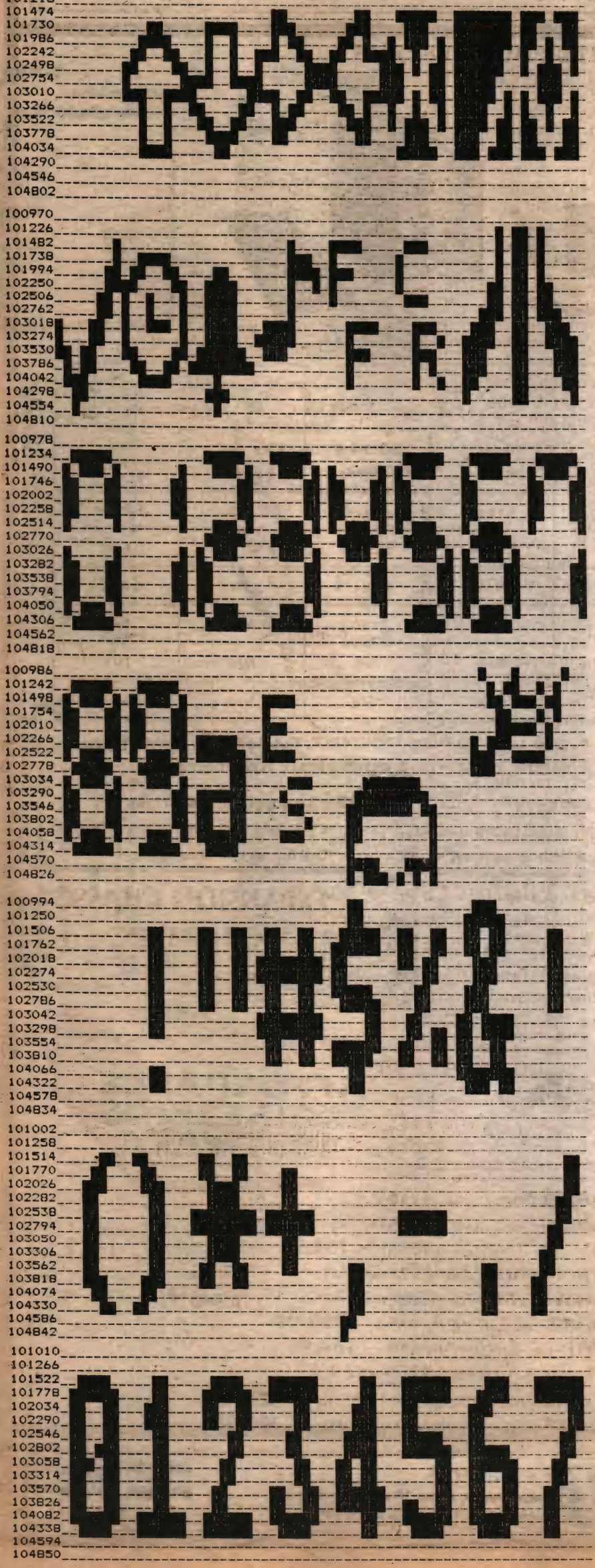
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FDUMP continued from page 58

```
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continued on page 146

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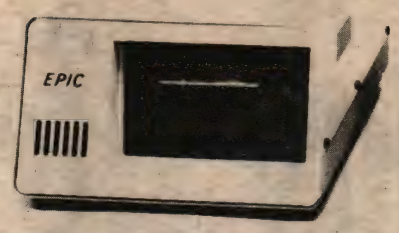
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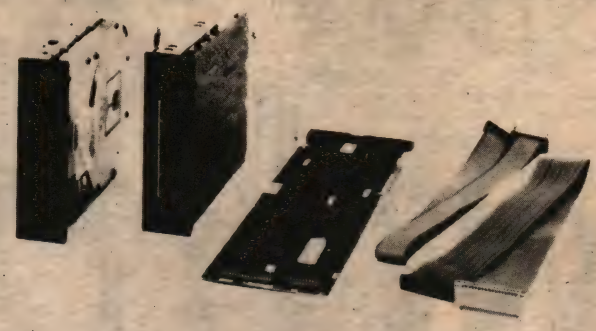
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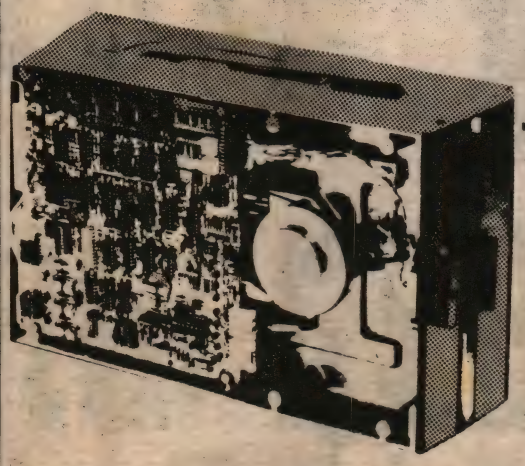
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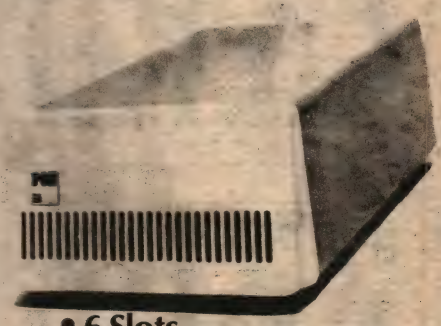
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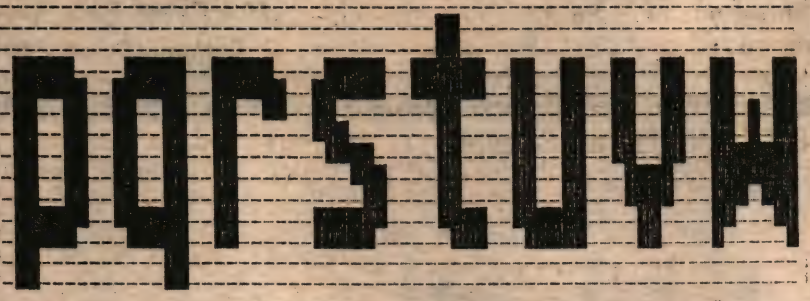
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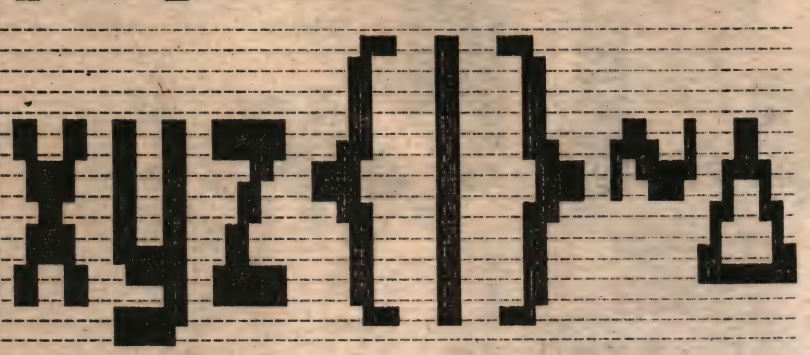
9-6 M-F...9-1 Sat.

FDUMP continued from page 144

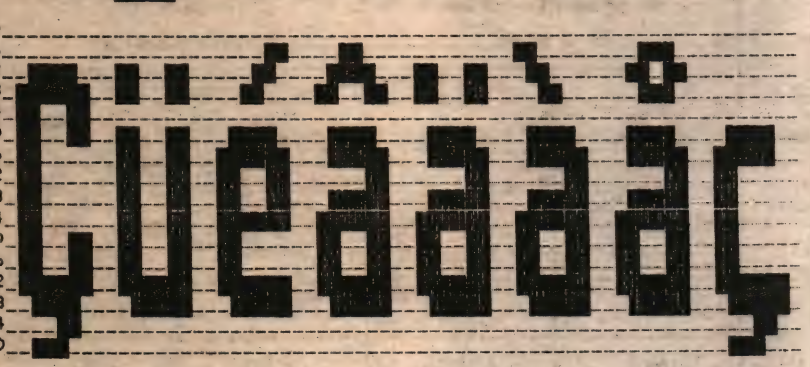
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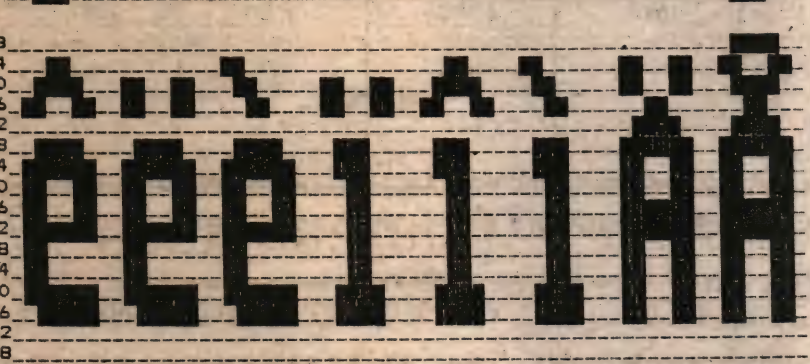
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104922
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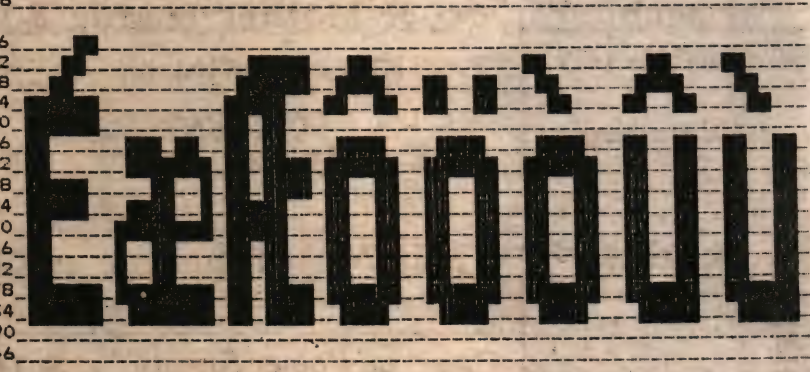
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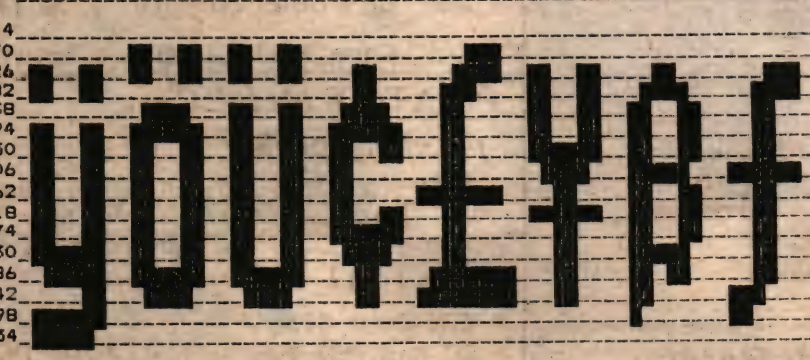
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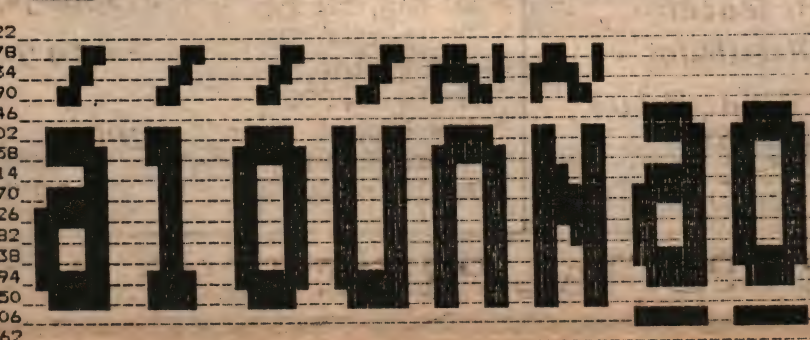
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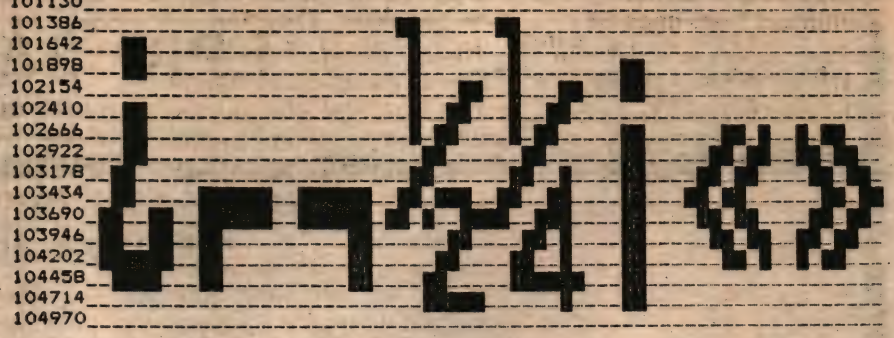
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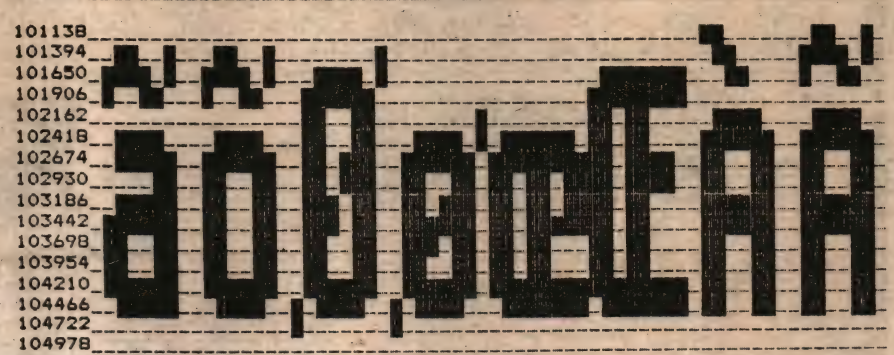
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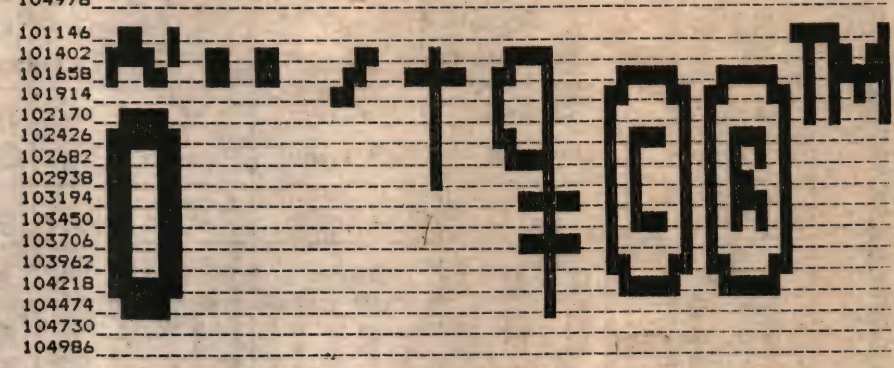
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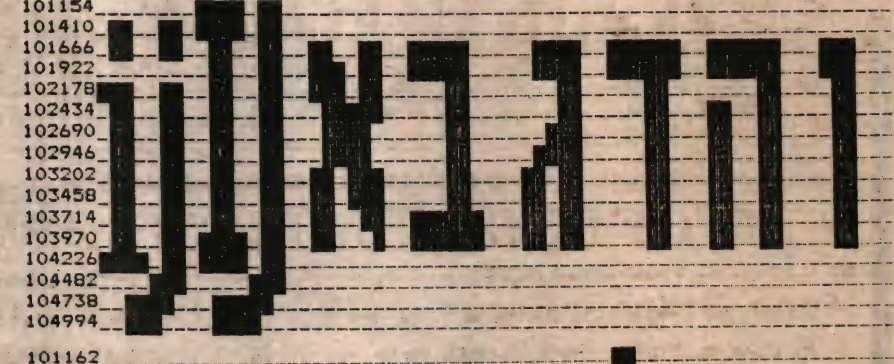
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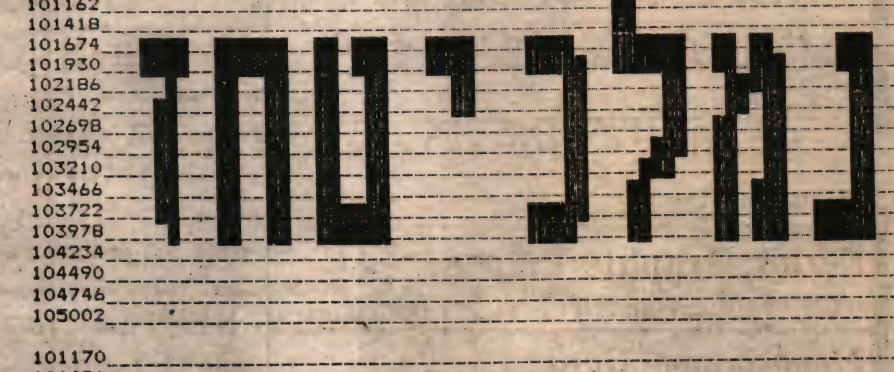
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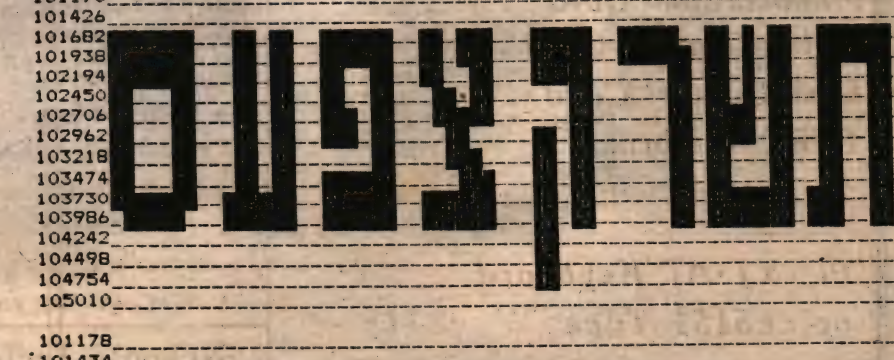
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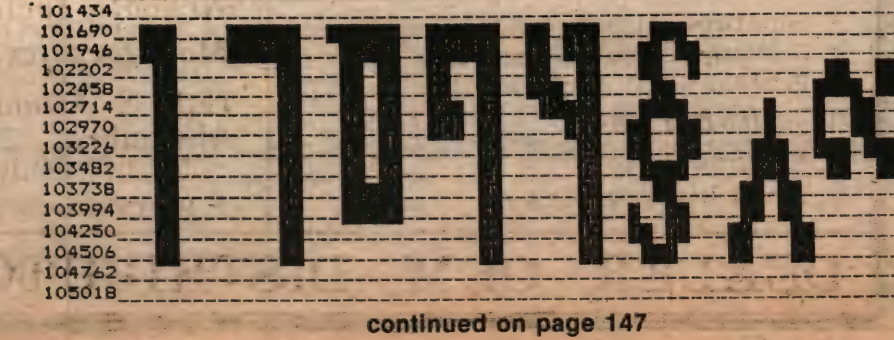
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103994
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104762
105018
```



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Applying The Atari
continued from page 58

sion" is available on diskette to readers for $5. (See address at end of this article.) You must have at least a 48K Atari to run RAP with the expanded vocabulary.

Halley's Comet

1986 is, of course, the year of Halley's Comet, and a few software packages on the Halley's Comet theme are available for the Atari astronomers out there. They are:

Halley Patrol, which includes an almanac and observing aid. A diskette for the 800/XL/XE is $19.95. (Urania Systems, Box 4890, Richmond, VA 23220).

Urania Systems (address above) all produces Spacebase, which is an astronomy program that turns your television screen into a planetarium. Over 400 heavenly objects can be plotted on the screen. $17.95 for a diskette for the 800/XL/XE.

The Halley Project is a recreational program which teaches characteristics of planets and moons. On diskette for the 800/XL/XE. (Mindscape, 3444 Dundee Road, Northbrook, IL 60062).

Corrections/Clarifications

In November's column, the first and last lines were mysteriously omitted from the Programmable Keypad Revision. These changes are necessary for the program to function properly with the XL/XE revisions:

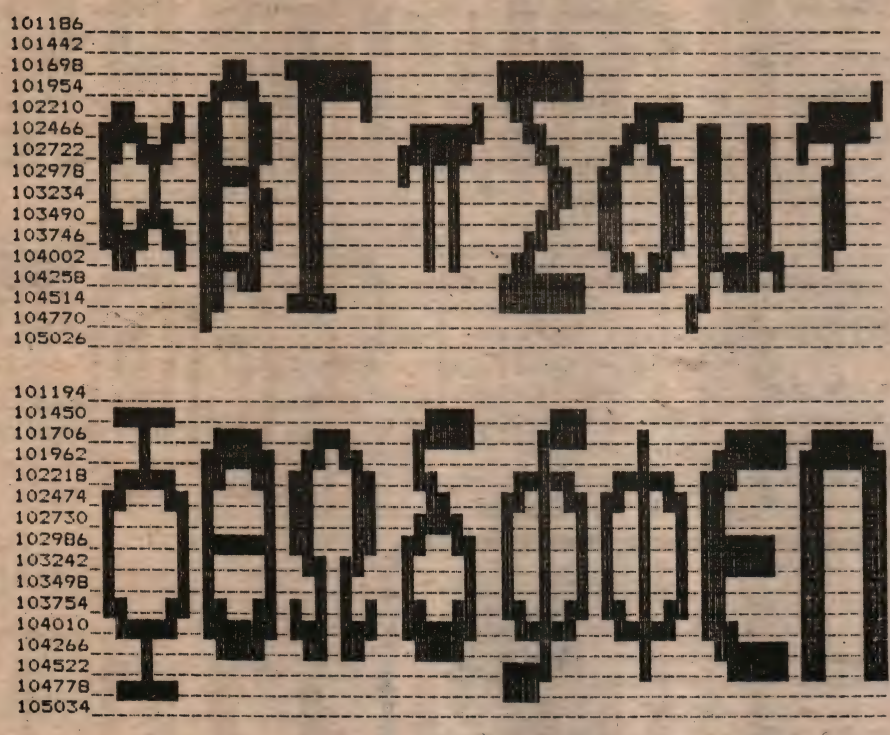
70 RESTORE:TOT = 0 :FOR I = 1536 TO 1616:READ NUM
490 FOR I = O TO 16:IF PR(I)>-1 THEN POKE 1599 + I,PR(I)

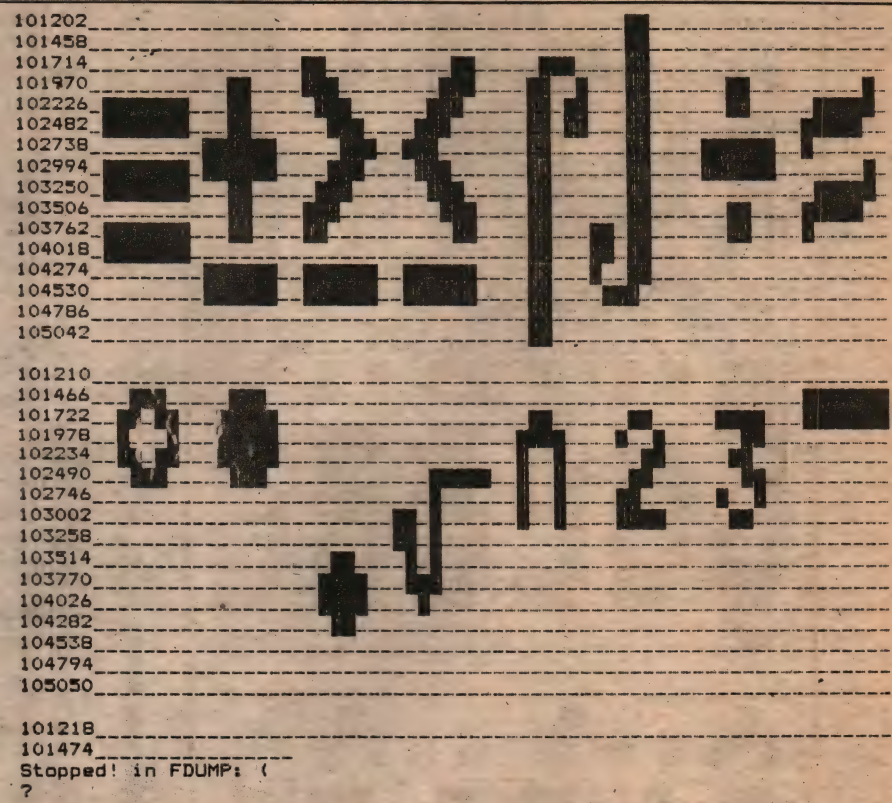
Additionally, change the following line in the Recipe Manager program:
1260 IF I = 28 THEN POP:K = 27:GOTO 730
This enables the ESC key to return you to the menu when you are on the CATEGORY: prompt.

In last month's column, the program segment that is labeled the "continued" section of the Simple Memory Tester is actually the remaining lines of the Recipe Manager Additions. Hence, the first part of Recipe

continued on page 149

FDUMP
continued from page 146





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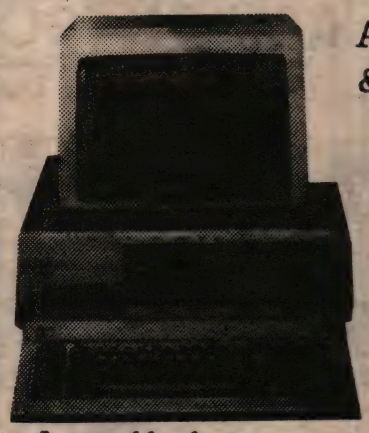
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Atari Help
continued from page 57

Q. I recently purchased a Percom disk for my Atari 800XL because of an article in the June 1983 issue of *Creative Computing* (pp. 114-116). However, the two Percom manuals refer only to the TI 99/4A. Will this drive work with my Atari 800XL?

Paul T. Johnson
Ellenville, NY

A. Unless you know of an electronics engineer who owes you a lot of favors, you're going to have a rough time trying to get a TI 99/4A Percom to work with the Atari. If you can somehow return the drive to where you purchased it, do so. I don't think you can still get an Atari Percom drive, but you may want to consider an Atari 1050 disk drive. Prices on this disk drive have dropped greatly in recent months.

Q. Do you know what's involved hooking up my Atari 130XE to my shortwave communications-receiver to decode morse on-line?

Robert Harren
Pueblo, CO

A. I suggest you contact Cantronics (1202 E. 23rd Street, Lawrence, KS 66044). I am told that this company sells various Atari-compatible interfaces and software for shortwave communications. Good luck.

Q. Thanks for the keyboard programs (latest version in November 1985 *Computer Shopper*, page 180). How can I change the program to make it operate with joystick port #2 instead of #1?

Donald Parsons
Delmar, NY

A. The following lines can be changed to read from joystick port 2 instead of port 1:

```
80 DATA 92,228,174,133,2,240,5,202
90 DATA 134,204,240,40,174,121,2,228
120 DATA 204,134,206,230,205,173,115,2
```

Address Atari-related questions to: Jeff Brenner, "Atari Help" c/o *Computer Shopper*, P.O. Box F, Titusville, FL 32781-9990. ●

MacUniverse
continued from page 94

(period) sequence to select text from the insertion point to the bottom of a document. This causes an emergency exit from the program;

2. MULTIPLAN: In Multiplan versions 1.02 and earlier, if the information stored in the clipboard is greater than 50 cells, and you see the message "Save Formatted/Unformatted Values," paste them into the Scrapbook before trying to paste into another application. Clipboards storing more than 50 cells will not transfer to the other application; and

3. CHART: When using Chart with Switcher, make it the first application that is installed. If you do not, arrows on charts may not appear in their correct positions.

BOOKS: Your Universe Master recently received two books that can be recommended; Clapp, *Doug Clapp's Jazz Book; The Quintessential Guide to Mastering Jazz on Your Macintosh* and Aker, *MicroSoft Basic Programming for the Mac*. Both are published by Scott, Foresman and company and cost $17.95.

Clapp's book is merely an introduction to using Jazz; not a Jazz encyclopedia. This book should be read by anyone thinking about buying Jazz. It will provide the reader with an overview of the program's capabilities and help the novice user get started. If you already have Jazz or are a computer whiz, save your money by not buying this book.

Aker's book is similarly limited. As stated in the introduction "whether you are new to BASIC or new to the Macintosh or new to both, this guide is meant for you." All the important concepts of MicroSoft BASIC are covered along with short programs illustrating each idea. The only caveat with this book is that your Universe Master does not know how current it is. Microsoft will shortly release version 2.01 of BASIC. If that version is as different from version 2.0 as 2.0 was from 1.0, then the book is seriously outdated.

COMPUSERVE: This month's CompuServe pick is an arcade game called Social Climber. The goal of the game is to transverse a level of seven floors within a limited time period without being hit by a moving elevator. Every time one level is transversed another level appears. The higher the level, the faster the elevators move and the less time you have to transverse it.

Social Climber is shareware and you are encouraged to send a small monetary token to the developer, CSI Design Group. Social Climber is found in DL5 of CompuServe MAUG SIG under the file name SCLIMB.BIN.

continued on page 160

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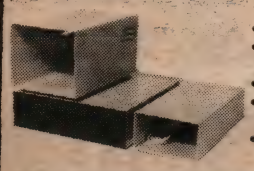
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PERSONAL APPOINTMENT CALENDAR & EDITOR

```
PEJ 10 REM PERSONAL APPOINTMENT CALENDAR/EDITOR
KGJ 20 REM COPYRIGHT 1986 JEFF BRENNER
YVJ 30 MIN=1985
FXJ 40 DIM DISK$(3),FILE$(20):DISK$="D1:"
EPJ 50 FILE$=DISK$:FILE$(LEN(FILE$)+1)="PACE.DAT"
YBJ 60 DIM TEXT$(200),A$(200),SP$(24),NAME$(30),DATE$(24),DAYS(30),SUM(11)
AUJ 70 DIM PW$(20),LS$(366),HS$(366),BYTE$(366),IN$(27),MR$(4),DEL$(23),S$(5)
LXJ 80 DIM MSG$(240):MSG$=CHR$(32):MSG$(240)=CHR$(32):MSG$(2)=MSG$
NUJ 90 TEXT$="START":GOSUB 1610:S$=TEXT$
DVJ 100 DEL$(1)=CHR$(156):DEL$(23)=CHR$(156):DEL$(2)=DEL$:DEL$(1,1)=CHR$(157)
LLJ 110 DIM MONTH$(36):RESTORE 2740:FOR I=1 TO 12:READ A$,DAYS
AUJ 120 MONTH$(LEN(MONTH$)+1)=A$(1,3):DAYS(I)=DAYS:NEXT I
GDJ 130 DIM DAY$(21):FOR I=1 TO 7:READ A$:DAY$(LEN(DAY$)+1)=A$(1,3):NEXT I
JXJ 140 SP$(1)=CHR$(32):SP$(24)=CHR$(32):SP$(2)=SP$:A$=CHR$(32):A$(2,2)=CHR$(29)
TVJ 150 A$(3,3)=CHR$(30):IN$=A$:FOR I=1 TO 8:IN$(LEN(IN$)+1)=A$:NEXT I
QHJ 160 RESTORE 2770:FOR I=0 TO 11:READ SUM:SUM(I)=SUM:NEXT I
JHJ 170 DL=PEEK(560)+256*PEEK(561):MR$=CHR$(28):MR$(2,2)=CHR$(156)
IQJ 180 MR$(3,4)=MR$
MEJ 190 OPEN #1,4,0,"K:":PRINT CHR$(125);"STAND BY...";GOSUB 2560:GOSUB 2920
EEJ 200 GOSUB 1450:POKE 85,8
UDJ 210 PRINT "INSERT YOUR DATA DISKETTE"
UOJ 220 TEXT$="RETURN":GOSUB 1610
BDJ 230 POKE 752,1:POKE 85,10:PRINT "PRESS ";TEXT$;" TO BEGIN":POKE 764,255:D=25
RJJ 240 POKE 1771,10:GOSUB 1500:IF PEEK(764)<255 THEN 260
PQJ 250 POKE 1771,4:GOSUB 1500:IF PEEK(764)=255 THEN 240
XHJ 260 GET #1,N:POSITION 2,3:PRINT CHR$(156);CHR$(156);:POKE 1771,10
GVJ 270 A$=DISK$:A$(LEN(A$)+1)="PACE.PNT"
JIJ 280 TRAP 1940:OPEN #2,4,0,A$:INPUT #2;NAME$,DATE$,M,D,Y,PW$:TRAP 40000
XMJ 290 FOR I=1 TO 3:INPUT #2,A$:LS$(LEN(LS$)+1)=A$:NEXT I
WWJ 300 FOR I=1 TO 3:INPUT #2,A$:HS$(LEN(HS$)+1)=A$:NEXT I
FUJ 310 FOR I=1 TO 3:INPUT #2,A$:BYTE$(LEN(BYTE$)+1)=A$:NEXT I:CLOSE #2
HXJ 320 IF LEN(PW$)=0 THEN 390
SLJ 330 FOR I=1 TO 3:POSITION 2,2
LRJ 340 POKE 1770,4:POKE 694,0:POKE 702,64:PRINT "PASSWORD:";INPUT #16;A$
XIJ 350 IF A$=PW$ THEN 380
CGJ 360 PRINT CHR$(28);CHR$(156);CHR$(29);CHR$(156);"(";3-I;") TRY AGAIN."
NUJ 370 PRINT CHR$(253);:NEXT I
SQJ 380 IF I=4 THEN GRAPHICS 0:PRINT "Access denied.";NEW
YCJ 390 POKE 1770,10:POKE 84,2:PRINT "HELLO, ";NAME$;"!";TEXT$="PACE":GOSUB 1610
OQJ 400 PRINT "The last time you used ";TEXT$;" was on";PRINT DATE$;"."
ANJ 410 GOSUB 420:GOTO 450
VFJ 420 PRINT SP$;PRINT "Use the ";S$;", ";
XMJ 430 TEXT$="SELECT":GOSUB 1610:PRINT TEXT$;" and ";
RAJ 440 TEXT$="OPTION":GOSUB 1610:PRINT TEXT$;" KEYS":RETURN
XYJ 450 PRINT " to set today's month, day and year."
SUJ 460 TEXT$="RETURN":GOSUB 1610:POKE 85,4
MNJ 470 PRINT "PRESS ";TEXT$;" WHEN THE DATE IS SET":GOSUB 480:GOTO 720
OFJ 480 POKE 764,255:PRINT :T=PEEK(84):FOR I=1776 TO 1778:POKE I,14:NEXT I
UNJ 490 FOR I=1779 TO 1781:POKE I,0:NEXT I:FOR I=1782 TO 1790:POKE I,4:NEXT I
PLJ 500 POKE 84,9:RESTORE 2420:FOR I=1 TO 3:POKE 85,13
WMJ 510 FOR J=1 TO 15:READ N:PRINT CHR$(N);:NEXT J:PRINT :NEXT I
DSJ 520 FOR I=DL+17 TO DL+19:POKE I,146:NEXT I:POKE 54276,10
MBJ 530 FOR I=1 TO 3:READ X:POKE 85,X:FOR J=1 TO 5:READ N:PRINT CHR$(N);
LDJ 540 NEXT J:PRINT :NEXT I
LBJ 550 POKE 84,10:SOUND 0,0,0,0
TFJ 560 POKE 85,14:PRINT MONTH$(M*3-2,M*3);:POKE 85,19:IF D<10 THEN PRINT "0";
QCJ 570 PRINT D;:POKE 85,23:PRINT Y;:SR=0
RVJ 580 NUM=SUM(M-1)+D+INT((Y-1752-(M<3))/4)+365*(Y-1753)-2
PIJ 590 YH=Y-(M<3):NUM=NUM-INT(YH/100)+INT(YH/400)-13
DPJ 600 WD=NUM-7*INT(NUM/7):IF SR THEN RETURN
CEJ 610 POSITION 28,13:PRINT DAY$(WD*3+1,WD*3+3)
HJJ 620 A=PEEK(53279):IF A=7 AND PEEK(764)=255 THEN W=0:GOTO 620
IKJ 630 IF A<>7 THEN SOUND 0,INT(A/2),,6,4
WVJ 640 LP=0:IF M=2 AND Y/4=INT(Y/4) THEN LP=1
JHJ 650 IF Y/100=INT(Y/100) THEN IF Y/400<>INT(Y/400) THEN LP=0
LQJ 660 IF A=6 THEN M=M+1:IF M>12 THEN M=1
GXJ 670 IF A=5 THEN D=D+1:IF D>DAYS(M)+LP THEN D=1
FWJ 680 IF A=3 THEN Y=Y+1:IF Y>MIN+15 THEN Y=MIN
UGJ 690 IF W<20 AND PEEK(53279)<>7 THEN W=W+1:SOUND 0,0,0,0:GOTO 690
OHJ 700 GOSUB 2530:IF PEEK(764)<>12 THEN 550
AYJ 710 RETURN
NKJ 720 SOUND 0,0,0,0:GOSUB 1520:GOSUB 1580
PRJ 730 TEXT$="PRESS":TEXT$(LEN(TEXT$)+1)=CHR$(2):POSITION 8,1
JQJ 740 TEXT$(LEN(TEXT$)+1)="ESC":TEXT$(LEN(TEXT$)+1)=CHR$(22)
HAJ 750 TEXT$(LEN(TEXT$)+1)="FOR TOMORROW'S":GOSUB 1610:PRINT TEXT$
SGJ 760 CLOSE #2:OPEN #2,12,0,FILE$
RZJ 770 POSITION 8,2:PRINT "Appointments for today,":GOSUB 780:GOTO 810
HAJ 780 RESTORE 2760:FOR I=0 TO WD:READ A$:NEXT I:POKE 85,8
WOJ 790 PRINT A$;CHR$(44);CHR$(32);MONTH$(M*3-2,M*3);CHR$(46);CHR$(32);
DGJ 800 PRINT D;CHR$(44);CHR$(32);Y;:PRINT SP$(1,33-PEEK(85));:RETURN
TPJ 810 GOSUB 2530:IF SEC+BYTE THEN POINT #2,SEC,BYTE
BBJ 820 GOSUB 830:GOTO 850
CBJ 830 FOR I=1 TO 9:A$=SP$:IF SEC+BYTE>0 THEN INPUT #2;A$
FEJ 840 POSITION 8,I+3:PRINT A$:NEXT I:RETURN
VOJ 850 POKE 764,255:POSITION 8,4:GOSUB 1920:IF CT THEN GOSUB 1350
CBJ 860 POSITION 8,2:PRINT "Tomorrow's Appointments."
APJ 870 TEXT$="TO CONTINUE":TEXT$(LEN(TEXT$)+1)=SP$(1,3):GOSUB 1610
RXJ 880 POSITION 18,1:PRINT TEXT$;:POSITION 8,1:PRINT CHR$(255);CHR$(160)
BIJ 890 POSITION 32,1:PRINT CHR$(32)
XEJ 900 REC2=REC:D2=D:M2=M:Y2=Y:WD2=WD:WD=WD+1:IF WD=7 THEN WD=0
WMJ 910 D=D+1:IF D>DAYS(M)+LP THEN D=1:M=M+1:IF M>12 THEN M=1:Y=Y+1
NEJ 920 POSITION 8,3:GOSUB 780
TSJ 930 GOSUB 2530:IF SEC+BYTE THEN POINT #2,SEC,BYTE
EQJ 940 GOSUB 830
VKJ 950 POKE 764,255:POSITION 8,4:GOSUB 1920:IF CT THEN GOSUB 1350
HAJ 960 GOSUB 1450:PRINT "Upcoming important entries:"
MTJ 970 POKE 752,1:PRINT :WD=WD+1:IF WD=7 THEN WD=0
RSJ 980 LN=LN+1:D=D+1:IF D>DAYS(M)+LP THEN D=1:M=M+1:IF M>12 THEN M=1:Y=Y+1
IZJ 990 RESTORE 2760:FOR I=0 TO WD:READ A$:NEXT I
JRJ 1000 PRINT A$(1,3);CHR$(32);M;"/";D;": ";
CZJ 1010 GOSUB 2530:IF SEC+BYTE=0 THEN GOTO 1060
CLJ 1020 POINT #2,SEC,BYTE
YIJ 1030 FOR J=1 TO 9:INPUT #2;A$:IF A$(1,1)<>"8" THEN NEXT J:GOTO 1100
YIJ 1040 PRINT A$:LN=LN+1:IF LN<16 THEN NEXT J:GOTO 1060
COJ 1050 GOSUB 1080:GOSUB 1450:NEXT J
RCJ 1060 IF LN>15 THEN GOSUB 1080:GOSUB 1450
FBJ 1070 GOTO 1100
QMJ 1080 PRINT :POKE 85,8:TEXT$="RETURN":GOSUB 1610
HBJ 1090 PRINT "Press ";TEXT$;" for more.":GET #1,A:LN=0:RETURN
KWJ 1100 IF REC<REC2+7 THEN 970
DHJ 1110 D=D2:M=M2:Y=Y2:WD=WD2:TEXT$="RETURN":GOSUB 1610
DNJ 1120 PRINT :POKE 85,8:PRINT "Press ";TEXT$;" to continue.":GET #1,A
EOJ 1130 GOSUB 1450:PRINT :PRINT "Want to enter appointments? ";:GOSUB 2460
WMJ 1140 IF N=78 THEN 2800
XWJ 1150 PRINT "Want to define the control keys? ";:GOSUB 2460
WJJ 1160 IF N=78 THEN 1220
IPJ 1170 PRINT "Type up to 24 characters for each":PRINT "control key."
OSJ 1180 TEXT$="RETURN":GOSUB 1610:PRINT "Press ";TEXT$;" by itself when you've"
UFJ 1190 PRINT "finished defining control keys."
HVJ 1200 PRINT :PRINT :FOR I=65 TO 74:PRINT MR$;"CONTROL-";CHR$(I);":"
JMJ 1210 INPUT #16;A$:IF LEN(A$) THEN MSG$((I-65)*24+1,(I-65)*24+24)=A$:NEXT I
GFJ 1220 GOSUB 1450:GOSUB 420:PRINT "to select date to add appointments."
OFJ 1230 PRINT :POKE 85,4:TEXT$="RETURN":GOSUB 1610
SPJ 1240 PRINT "PRESS ";TEXT$;" WHEN THE DATE IS SET"
NYJ 1250 POKE 752,1:GOSUB 480:POKE 752,0:SOUND 0,0,0,0:GOSUB 1520:GOSUB 1580
UVJ 1260 TEXT$="PRESS":TEXT$(LEN(TEXT$)+1)=CHR$(2):TEXT$(LEN(TEXT$)+1)="ESC"
JCJ 1270 TEXT$(LEN(TEXT$)+1)=CHR$(22):TEXT$(LEN(TEXT$)+1)="TO CONTINUE"
MJJ 1280 GOSUB 1610:POSITION 8,1:PRINT CHR$(160);TEXT$;CHR$(160);CHR$(160)
CYJ 1290 POSITION 8,2:PRINT "Appointments for: ";GOSUB 780
YMJ 1300 IF SEC+BYTE>0 THEN POINT #2,SEC,BYTE
SJJ 1310 GOSUB 830:POSITION 8,4:GOSUB 1920:IF CT THEN GOSUB 1350
BAJ 1320 GOSUB 1450:PRINT "Add or change more appointments? ";:GOSUB 2460
WNJ 1330 IF N=78 THEN 2800
FEJ 1340 GOTO 1220
XIJ 1350 NF=1:GOSUB 2530:IF SEC+BYTE>0 THEN NF=0:POINT #2,SEC,BYTE:GOTO 1390
SJJ 1360 CLOSE #2:OPEN #2,9,0,FILE$
NJJ 1370 NOTE #2,SEC,BYTE:H=INT(SEC/256):L=SEC-H*256
UIJ 1380 HS$(REC,REC)=CHR$(H):LS$(REC,REC)=CHR$(L):BYTE$(REC,REC)=CHR$(BYTE)
HOJ 1390 POKE 842,13:FOR I=1 TO 9:POSITION 8,3+I:INPUT #16;A$
WRJ 1400 IF LEN(A$)>24 THEN A$=A$(1,24)
SQJ 1410 IF LEN(A$)<24 THEN A$(LEN(A$)+1,24)=SP$
FLJ 1420 PRINT #2;A$:NEXT I:POKE 842,12
VLJ 1430 IF NF THEN CLOSE #2:OPEN #2,12,0,FILE$
PBJ 1440 CT=0:RETURN
TCJ 1450 GRAPHICS 0:POKE 16,64:POKE 53774,64:A=USR(1664)
HXJ 1460 POKE 559,0:POKE 1767,0:POKE 1768,0:TEXT$=CHR$(32):SETCOLOR 4,9,0
QTJ 1470 POKE 53248,0:POKE 53249,0
NFJ 1480 PRINT CHR$(125);:POSITION 0,0:PRINT M1$:POSITION 0,1:PRINT M2$
FBJ 1490 POKE 559,34:RETURN
GBJ 1500 FOR I=1 TO D:IF PEEK(764)=255 THEN NEXT I
CTJ 1510 RETURN
NSJ 1520 GOSUB 1450:POKE 559,0:PRINT CHR$(125);:POKE 623,0:POKE 764,255:CT=0
QHJ 1530 FOR I=1771 TO 1790:POKE I,10:NEXT I
UWJ 1540 POKE 1767,1:POKE 1768,8:POKE 1769,14:POKE 1770,14:POKE 1788,1
MLJ 1550 RESTORE 2780:FOR I=0 TO 31:READ N:POKE DL+I,N:NEXT I
DIJ 1560 POSITION 8,0:PRINT M3$;:POSITION 8,13:PRINT M4$
FAJ 1570 POKE 559,34:RETURN
LIJ 1580 SETCOLOR 4,9,0:POKE 704,144:POKE 705,144:POKE 53277,3:POKE 53248,48
JPJ 1590 POKE 53277,0:POKE 53261,255:POKE 53249,176:POKE 53262,255
KKJ 1600 POKE 53256,3:POKE 53257,3:RETURN
KUJ 1610 FOR I=1 TO LEN(TEXT$)
```

PACE continued on page 150

Applying The Atari
continued from page 147

Manager Additions appears on page 162 of December's column, and the continuation appears on page 66--confusion, confusion!

520 ST Newsletter

The Jackintosh Boston Users' Group is a part of The Boston Computer Society for Atari 520ST users and has sent me its latest newsletter for ST users. Their address: The Boston computer Society, Jackintosh User Group, One Center Plaza, Boston, MA 02108. Other groups: Let's see your newsletters--send them in to me.

PACE

Now it's time to enter PACE, the Personal Appointment Calendar & Editor. PACE will keep you in step with your latest plans and will remind you days in advance when important occasions, such as birthdays or exams, are approaching so you'll have time to prepare (i.e. buy and send out cards, or study). PACE can also provide you with a printout of your daily

continued on page 150

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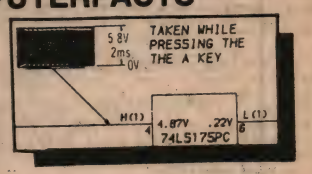


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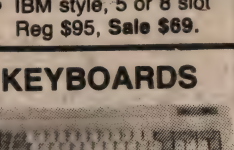
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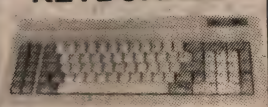
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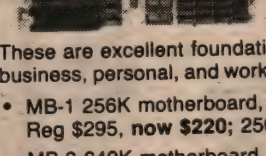
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Applying The Atari

continued from page 149

schedule each day.

Since the program is over 300 lines long, you should be prepared to spend some time typing it in. It's a practical, user-friendly program, and it'll be worth the effort. PACE requires a minimum of 32K and will work with diskette system only. Since PACE takes advantage of the random-access capabilities of the disk drive, a cassette recorder cannot be used.

PACE program continued from page 149

```
GOJ 1620 TEXT$(I,I)=CHR$(ASC(TEXT$(I,I))+128):NEXT I:RETURN
TMJ 1630 POKE 85,(40-LEN(TEXT$))/2:PRINT TEXT$:RETURN
TGJ 1640 TRAP 40000:CT=0
PVJ 1650 GET #1,K:IF PEEK(694)>0 THEN K=K-128:POKE 694,0
XIJ 1660 IF K>27 AND K<123 OR K=127 OR K=154 OR K=155 OR K=126 THEN 1840
LVJ 1670 IF K=16 THEN GOSUB 2650:GOTO 1920
YNJ 1680 IF K=254 THEN 1840
BWJ 1690 IF K<>157 THEN 1720
UNJ 1700 POKE 752,1:PRINT CHR$(K);:V=PEEK(84):POSITION 8,13:PRINT CHR$(156);
WOJ 1710 CT=CT+1:POKE 84,V:POKE 85,8:GOTO 1920
BSJ 1720 IF K<>156 THEN 1750
RCJ 1730 POKE 752,1:POKE 1787,4:PRINT CHR$(K);:V=PEEK(84):CT=CT+1
JOJ 1740 POSITION 8,12:PRINT CHR$(157);:POKE 1787,10:GOTO 1710
ICJ 1750 IF K=27 THEN RETURN
YOJ 1760 IF K<255 THEN 1790
GPJ 1770 PRINT CHR$(K);:H=PEEK(85):V=PEEK(84):POSITION 32,4:POKE 752,1
REJ 1780 PRINT IN$:POSITION H,V:GOTO 1850
WIJ 1790 IF K>10 THEN 1820
MHJ 1800 POKE 752,1:PRINT MSG$(K*24-23,K*24-PEEK(85)+8)
QEJ 1810 POKE 85,8:CT=5:GOTO 1850
WMJ 1820 SOUND 1,60,6,8:FOR I=1 TO 40:NEXT I:SOUND 1,0,0,0
FPJ 1830 GOTO 1650
NVJ 1840 CT=CT+1:POKE 752,1:PRINT CHR$(K);:IF K=156 OR K=157 THEN POKE 85,8
TEJ 1850 IF PEEK(85)>31 THEN POKE 85,8:POKE 84,PEEK(84)+1
AXJ 1860 IF PEEK(84)>12 THEN POKE 84,4
LJJ 1870 IF PEEK(85)>7 THEN 1910
RPJ 1880 IF K=126 THEN POKE 85,32:POKE 84,PEEK(84)-1:PRINT CHR$(K);:GOTO 1910
KZJ 1890 IF K=155 THEN POKE 85,8:GOTO 1910
ADJ 1900 POKE 85,31:POKE 84,PEEK(84)-1
ARJ 1910 IF PEEK(84)<4 THEN POKE 84,12
NXJ 1920 POKE 752,0:PRINT CHR$(31);CHR$(30);
FQJ 1930 GOTO 1650
GEJ 1940 CLOSE #2:E=PEEK(195)
BJJ 1950 IF E<>144 THEN 2060
XNJ 1960 POSITION 2,2:PRINT DEL$;"Diskette must be formatted."
OYJ 1970 POKE 752,0:PRINT "Want to format this diskette? ";:GOSUB 2460
UUJ 1980 IF N=78 THEN 200
HHJ 1990 POKE 752,1
GKJ 2000 PRINT MR$;"Press ";S$;" to format disk in drive ";DISK$(2,2)
IPJ 2010 TEXT$="OPTION":GOSUB 1610:PRINT "or press ";TEXT$;" to cancel."
XGJ 2020 A=PEEK(53279):IF A<>3 AND A<>6 THEN 2020
OPJ 2030 IF PEEK(53279)=3 THEN 200
YAJ 2040 PRINT "Formatting...";:X10 253,#7,33,87,DISK$
BYJ 2050 POSITION 2,2:PRINT DEL$;"Formatting completed.":GOTO 2080
BGJ 2060 IF E<>170 THEN 2380
KRJ 2070 POSITION 2,2:PRINT DEL$;"No appointment file on this disk."
GYJ 2080 POKE 752,0:PRINT "Create an appointment file? ";:GOSUB 2460
UNJ 2090 IF N=78 THEN 200
TXJ 2100 POSITION 2,2:PRINT DEL$;"Enter your name.":INPUT #16;NAME$
TJJ 2110 PRINT MR$;"Enter the date (Example: 1/12/86).":INPUT #16;A$
LMJ 2120 TRAP 2110:FOR I=2 TO LEN(A$):IF A$(1,I)<>"/" THEN NEXT I
EOJ 2130 M=VAL(A$(1,I-1)):FOR J=I+2 TO LEN(A$):IF A$(J,J)<>"/" THEN NEXT J
VUJ 2140 D=VAL(A$(I+1,J-1)):Y=VAL(A$(J+1)):IF Y>99 THEN 2150
FOJ 2150 TRAP 40000:C=INT(MIN/100)*100:IF Y>=MIN-C THEN Y=Y+C:GOTO 2170
FAJ 2160 Y=Y+C+100
NNJ 2170 PRINT MR$;"Enter a password (RETURN for none).":INPUT #16;PW$
THJ 2180 SR=1:GOSUB 580
GLJ 2190 RESTORE 2760:FOR I=0 TO WD:READ A$:NEXT I:DATE$=A$
LFJ 2200 DATE$(LEN(DATE$)+1)=CHR$(44):DATE$(LEN(DATE$)+1)=CHR$(32)
HJJ 2210 DATE$(LEN(DATE$)+1)=MONTH$(M*3-2,M*3):DATE$(LEN(DATE$)+1)=CHR$(46)
KZJ 2220 DATE$(LEN(DATE$)+1)=CHR$(32):DATE$(LEN(DATE$)+1)=STR$(D)
LIJ 2230 DATE$(LEN(DATE$)+1)=CHR$(44):DATE$(LEN(DATE$)+1)=CHR$(32)
WHJ 2240 DATE$(LEN(DATE$)+1)=STR$(Y)
SBJ 2250 PRINT MR$;"NAME: ";NAME$:PRINT "DATE: ";DATE$
GNJ 2260 IF LEN(PW$) THEN PRINT "PASSWORD: ";PW$
GGJ 2270 IF LEN(PW$)=0 THEN PRINT "NO PASSWORD."
FTJ 2280 PRINT "Is all of the above correct? ";:GOSUB 2460
KTJ 2290 IF N=78 THEN GOTO 2100
RMJ 2300 PRINT "Saving this data..."
IOJ 2310 A$=DISK$:A$(LEN(A$)+1)="PACE.PNT"
JHJ 2320 OPEN #2,8,0,A$:PRINT #2;NAME$;CHR$(155);DATE$;CHR$(155);
SRJ 2330 PRINT #2;M;CHR$(155);D;CHR$(155);Y;CHR$(155);PW$
EZJ 2340 A$=CHR$(0):A$(122)=CHR$(0):A$(2)=A$
FHJ 2350 FOR I=1 TO 9:PRINT #2;A$:NEXT I:CLOSE #2
KDJ 2360 A$=DISK$:A$(LEN(A$)+1)="PACE.DAT":OPEN #2,8,0,A$:CLOSE #2:POKE 752,1
JYJ 2370 GOSUB 1450:POKE 85,4:PRINT "Appointment file has been made.":GOTO 220
PLJ 2380 TEXT$="ERROR #":TEXT$(LEN(TEXT$)+1)=STR$(E):GOSUB 1610:GOSUB 1630
NUJ 2390 TEXT$="START":GOSUB 1610:PRINT "Press ";TEXT$;" to start again."
TCJ 2400 IF PEEK(53279)<>6 THEN 2400
DEJ 2410 GOTO 200
YOJ 2420 DATA 17,18,18,18,5,17,18,18,5,17,18,18,18,18,5
QYJ 2430 DATA 124,32,32,32,124,124,32,32,124,124,32,32,32,32,124
YKJ 2440 DATA 26,18,18,18,3,26,18,18,3,26,18,18,18,18,3
VXJ 2450 DATA 19,17,18,18,18,5,27,124,32,32,32,124,35,26,18,18,18,3
IEJ 2460 H=PEEK(85)
ELJ 2470 POKE 694,0:POKE 702,64:GET #1,N:IF N>128 THEN N=N-128
KNJ 2480 IF N=78 THEN PRINT "NO":RETURN
OFJ 2490 IF N=89 THEN PRINT "YES":RETURN
YOJ 2500 PRINT
HPJ 2510 PRINT CHR$(156);CHR$(253);"Y OR N";CHR$(28);
LFJ 2520 POKE 85,H:PRINT CHR$(30);CHR$(31);:GOTO 2470
VNJ 2530 REC=SUM(M-1)+D:IF M>2 THEN REC=REC+1
KHJ 2540 SEC=ASC(HS$(REC,REC))*256+ASC(LS$(REC,REC))
POJ 2550 BYTE=ASC(BYTE$(REC,REC)):RETURN
JHJ 2560 I=40:DIM M1$(1),M2$(1),M3$(1),M4$(1)
RRJ 2570 TEXT$=CHR$(32)
XHJ 2580 TEXT$(LEN(TEXT$)+1)="Personal Appointment Calendar & Editor"
APJ 2590 TEXT$(LEN(TEXT$)+1)=CHR$(32):GOSUB 1610:M1$=TEXT$
LCJ 2600 TEXT$=SP$(1,7):TEXT$(LEN(TEXT$)+1)="Copyright 1986 Jeff Brenner"
YXJ 2610 TEXT$(LEN(TEXT$)+1)=SP$(1,6):GOSUB 1610:M2$=TEXT$
UIJ 2620 TEXT$="PACE APPOINTMENT DISPLAY":GOSUB 1610:M3$=TEXT$
UHJ 2630 TEXT$="PRESS CONTROL-P TO PRINT":GOSUB 1610:M4$=TEXT$
CYJ 2640 RETURN
NHJ 2650 TRAP 2680:OPEN #3,8,0,"P:":PRINT #3
CJJ 2660 FOR I=2 TO 12:POKE 842,13:POSITION 8,I:INPUT #16;A$:PRINT #3;A$:NEXT I
IPJ 2670 POSITION 8,4:PRINT #3:RETURN
QVJ 2680 CLOSE #3:TEXT$="PRINTER DOES NOT RESPOND":GOSUB 1610
CTJ 2690 H=PEEK(85):V=PEEK(84):POSITION 8,13:PRINT TEXT$
BJJ 2700 POKE 1788,14:SOUND 1,50,6,8:FOR I=1 TO 40:NEXT I:SOUND 1,0,0,0
YNJ 2710 POSITION H,V:PRINT CHR$(31);CHR$(30);
RAJ 2720 IF PEEK(764)=255 THEN 2720
AUJ 2730 POSITION 8,13:PRINT M4$:POKE 1788,1:POSITION H,V:RETURN
BHJ 2740 DATA JANUARY,31,FEBRUARY,28,MARCH,31,APRIL,30,MAY,31,JUNE,30,JULY,31
FRJ 2750 DATA AUGUST,31,SEPTEMBER,30,OCTOBER,31,NOVEMBER,30,DECEMBER,31
EMJ 2760 DATA SUNDAY,MONDAY,TUESDAY,WEDNESDAY,THURSDAY,FRIDAY,SATURDAY
BAJ 2770 DATA 0,31,59,90,120,151,181,212,243,273,304,334
MXJ 2780 DATA 240,112,112,194,64,156,130,112,130,130,112,130,128,130,128,130
LUJ 2790 DATA 128,130,128,130,128,130,128,130,128,130,128,130,65,32,156
SZJ 2800 GOSUB 1450:PRINT "Saving appointment data...":CLOSE #2
NDJ 2810 M=M2:D=D2:Y=Y2:WD=WD2
HIJ 2820 GOSUB 780:POKE 842,13:POSITION 8,4:INPUT #16;DATE$:POKE 842,12
PHJ 2830 A$=DISK$:A$(LEN(A$)+1)="PACE.PNT":OPEN #2,8,0,A$
EZJ 2840 PRINT #2;NAME$;CHR$(155);DATE$
SYJ 2850 PRINT #2;M;CHR$(155);D;CHR$(155);Y;CHR$(155);PW$
XTJ 2860 FOR I=0 TO 2:PRINT #2;LS$(I*122+1,I*122+122):NEXT I
XOJ 2870 FOR I=0 TO 2:PRINT #2;HS$(I*122+1,I*122+122):NEXT I
EOJ 2880 FOR I=0 TO 2:PRINT #2;BYTE$(I*122+1,I*122+122):NEXT I
NKJ 2890 CLOSE #2:PRINT "Run this program again? ";:GOSUB 2460
CNJ 2900 IF N=89 THEN GRAPHICS 0:RUN
UWJ 2910 GRAPHICS 0:END
SNJ 2920 REM MULTI-LUMINANCE SUBROUTINE
OJJ 2930 REM COPYRIGHT 1985 JEFF BRENNER
AOJ 2940 IF PEEK(1664)>0 THEN RETURN
XRJ 2950 RESTORE 3000:I=0
CLJ 2960 READ NUM:IF NUM=-1 THEN 2980
VHJ 2970 TOT=TOT+NUM+1:POKE 1664+I,NUM:I=I+1:GOTO 2960
VQJ 2980 IF TOT<>1310 THEN PRINT "ERROR-CHECK DATA LINES":STOP
GCJ 2990 A=USR(1664):RETURN
ROJ 3000 DATA 104,173,48,2,133,204,173,49,2,133,205,160,26,169,10
VMJ 3010 DATA 153,230,6,136,208,250,160,0,177,204,9,128,145,204,160
SHJ 3020 DATA 3,177,204,9,128,145,204,160,6,177,204,9,128,145,204
MHJ 3030 DATA 200,192,28,208,245,169,197,141,0,2,169,6,141,1,2
RVJ 3040 DATA 173,14,212,9,128,141,14,212,96,72,152,72,173,11,212
RHJ 3050 DATA 201,7,240,18,201,8,240,14,230,204,164,204,185,231,6
QHZ 3060 DATA 141,23,208,104,168,104,64,169,0,133,204,240,238,-1

[END OF LISTING]
```

Enter the program listed under the "Personal Appointment Calendar & Editor" heading and save it to diskette. Remember to use Program Perfect so you don't get stuck with inumerable typing errors.

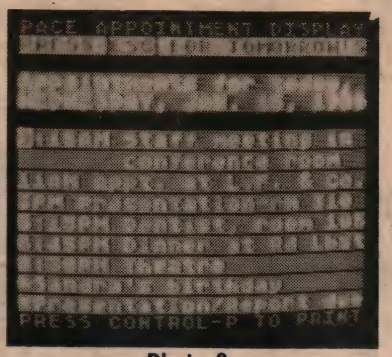


Photo 3

When you run the program, you'll be ased to "INSERT YOUR DATA DISKETTE." If you are using a single-density format, you'll need a separate blank diskette to store the data. If you're using dual-density format, you have room to store the data file and the program on the same diskette. If you place an unformatted diskette into the dirve, the program will format it for you if you answer Y to the "Want to format diskette?" prompt.

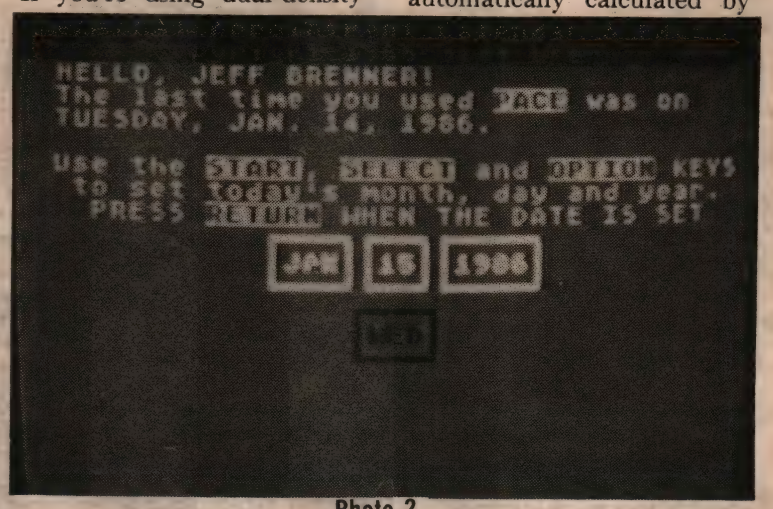


Photo 2

Next, PACE will create an appointment file on the data diskette. Type Y for the "Create an appointment file?" prompt and enter your name and today's date as directed. Then you will be asked to enter a password. Since this will be your personal appointment calendar, you may want to prevent others from peering at your plans. You can enter any password you want, or you can just press RETURN if you would rather not have a password. If you opt for the password, be sure it's one you'll remember!

You'll be given the opportunity to correct any errors and then will be brought to the main screen (see Photo 2).

This is the screen that you'll see each time you run the program. If you have chosen a password, you'll have to enter the password correctly before you can access this screen.

Your name is displayed along with the date that you last used PACE. The date in the center of the screen is used to display the current date. Since you just created a data file, the previous date and the current date will be the same. When you use PACE in the future, use the START, SELECT and OPTION keys to set the new date. The day of the week is automatically calculated by the program for any day of the year. You'll probably want to use PACE at least once a day to see your daily plans, upcoming plans, and to enter new appointments.

Press RETURN when the current date is set and the PACE Appointment Display is shown. This mini-screen is where your daily appointments are read. Since you have not yet entered any appointments, this screen will be blank, but Photo 3 shows what a typical schedule might look like. The asterisks denote important occasions that are to be brought to our attention days in advance, such as birthdays or deadlines. If you have a printer, CONTROL-P can be used at any time to print out the schedule on paper. You could also make changes on this screen at any time and they will be recorded on the diskette.

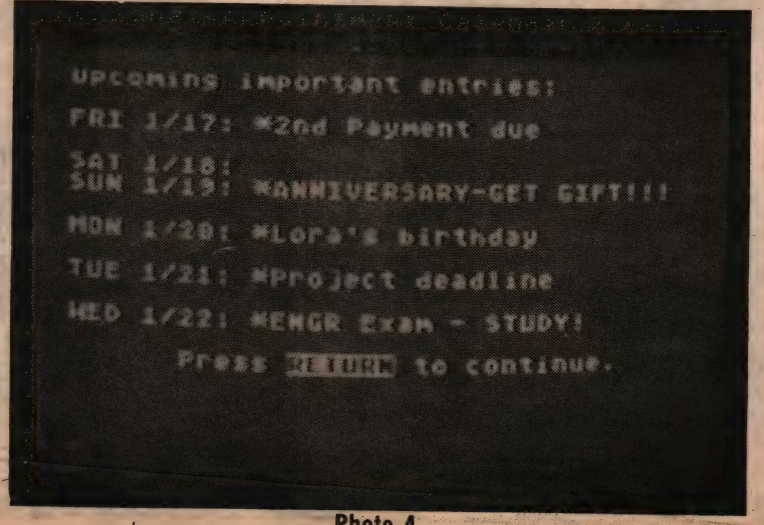


Photo 4

Pressing ESC will show you the following day's schedule. You can revise or print out this schedule too.

Another press of the ESC key brings you to the "Upcoming important entries" screen. Here the program gives you a look at important occasions (those that had been preceded by an asterisk) that are approaching within the next seven days (see Photo 4).

When you press RETURN, you are asked if you want to enter appointments. If you type Y for this prompt, you will be returned to the main screen where you will be asked to set the date for which you want to enter appointments. You will then be brought to the PACE Appointment Display where you can enter appointments for that date. You can type freely on the mini-screen as you choose, using the Atari's control and cursor keys for positioning and editing.

You can continue entering appointments for any number of future dates by answering Y each time to the "Add or change more appointments?" prompt.

When you're done, the program will take a few seconds to save its reference data to the data diskette and will give you the option of stopping or rerunning the program. Up to 366 days of schedules can be stored on a diskette.

Happy New Year to all readers, and may you never miss a dentist appointment, birthday, anniversary, studying for an exam, etc., again!

Next Month

We'll have more details on PACE and hopefully a Halley's Comet program, more reader mail and surprises too. Stay tuned.

Readers' questions, comments and contributions are welcome. Please enclose a self-addressed, stamped envelope for a personal reply.

A diskette of the programs listed in this month's column is available from the author for $7.00, postpaid. Please specify your disk drive model.

"Program Perfect" is utility used to check for typing errors while entering programs from this column. Readers may send $5.00 for a diskette of this program and documentation.

Address all correspondence to:

Jeff Brenner
"Applying The Atari 1/86"
c/o *Computer Shopper*
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AM-XT Motherboard (4 layer P.C.B.) 128K **$295**
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Tandy Reviews
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ribbons that had physical malfunctions. During that same time I have used 10 or 12 (I lost count after 9) cases of paper. We have had no print head problems and, since the MacInker came on the scene, there have been no inked up hands. There is a box of ribbon re-fills in the cabinet that have been there since we started re-inking and will probably stay there "forever more."

Several times I have started to write a review based on the single ribbon model MacInker but for one reason or another put it off. Now I am glad I procrastinated because the new Universal MacInker is super! Instead of buying a MacInker for each type of ribbon you use, you buy one of the new Universal models set up for one of your ribbon types and then get the MacInker UC Driver(s) for the other type(s). The Universal is available in two types, UC (Universal Cartridge) and US (Universal Spool). Even if you have one printer it would pay to get the Universal model against the time you get a new printer or need to re-ink for a friend(s).

There were dire predictions from "those in the know" about clogged printer heads and ink messes in and on the printer when I first started re-inking ribbons. I am sure that some have had problems in the past but there have been none with the Computer Friends re-inker and supplies. I know that some of my ribbons have been used twenty times and more. This involved mostly straight typing and not enough graphics to speak about. I believe the statement that it costs about 5 cents a ribbon to re-ink them. The small bottle of ink seems to last forever. Of course if you only use one ribbon a year, forget it! You have to use enough ribbons to make it worth while purchasing the MacInker.

The actual re-inking takes about one minute of your time and fifteen minutes of the MacInker's time. The ribbon fits down on the re-inker and the ribbon goes around two soft rollers that serve as ink reservoirs. Turn on the motor and go away. Set a timer for about fifteen minutes if you tend to forget things as I do or you will come back to a *RE-INKED RIBBON!!* if it runs too long. Don't judge the re-inking process by how the ribbon looks. Every time I have inked a ribbon until it looks like it was "done," I've drowned it in ink. The process that we have settled on is to run the ribbon on the re-inker for fifteen minutes (the time will vary with the type of ribbon), put it in a baggie and set it away for a least a couple of days. Apparently the ink migrates on the ribbon to produce an even inking after a day or so. The ribbon looks like it is spotty when it is first re-inked. Don't let that prod you into using a longer run. You will regret it because of the mess. *Be sure to inspect the ribbon and case before re-inking it!!!* Make sure that the ribbon runs free and is not torn. Check the case for breaks and be sure the tension spring on the roller is working as it should. Don't try to get "one more use" out of a bad ribbon. The least that will suffer is your document and you could screw up your print head royally. If you are not sure how long it takes the ribbon to make one complete trip through the inker, try this little trick. Mark the ribbon with liquid paper on both sides and run it until the mark shows up again. Use that length of time as your re-inking time.

Computer Friends offers a MacInker for "any printer: cartridge/spool/harmonica/zip/pack." They also have ribbons, pre-inked or blank. Multi-colored inks are also available to spice up your word processing. The MacInker comes with a supply of ink that will go a long way before you have to reorder.

The only fault that I found with the MacInker that was in the least irritating was the Model for the MX/RX 80 did not run straight. I have to put a shim under the back edge of the ribbon case to keep the ribbon in alignment. Even at that it is a blessing when I add up the dollars that have been saved in just this year in my lab. The Universal MacInker has a ribbon guide that eliminates this problem. The re-inker is like the computer, it sits idle more than it actually works so we are re-inking ribbons for other departments.

The documentation is plain

continued on page 153

MIRAC RS232 ANALOG CONVERTER BOARDS

Z8-65 RS232 interface with daisy chain feature Software clock—no battery. 8 channel 8 bit A/D converter (0-5V). 12 digital (TTL) I/O control lines. Simple ASCII control commands. **$245**

Z8-65A Same specifications as Z8-65 except the A/D converter is a 4 line 12 bit unit. **$362**

Z8-45 RS232 interface with daisy chain feature. Hardware real time clock with backup battery. 16 channel 12 bit A/D converter (+—5V). Software settable gain amplifier for A/D. Simple ASCII control commands. **$451**

Z8-65D Same as Z8-65 described above but has an interface for DORIC series 400 Trendicators. Thermocouple and temperature readings available to host through simple ASCII commands. **$442**

Z8-65AD Same as Z8-65A described above but has DORIC series 400 Trendicator interface. Up to 8 DORIC units can be connected to one Z8-65D or one Z8-65AD for an additional cost of $165 per DORIC. **$559**

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Quick Look
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bothered me. Consider AutoPad. This spreadsheet program is buggy. Specifically, it is totally intolerant of any deviation from correct input format. Every time I tried to use it, the program crashed, and I had no way to recover except rerun the program all over. Second, it is slow and limited. How slow I cannot say, because bugs are so bad that I could rarely get a formula in to check the speed. But there is another aspect to speed, and that is data entry: You cannot freeform-enter information such as labels and formulas; you must first touch a function key. Each entry must be followed by Enter. The third point is a quibble, perhaps: Mathematically, the program is disastrous insofar as all operations in it, as well as in the little calculator program, are predicated upon a left-to-right structure. Thus, in mathematics (the discipline in which I hold a PhD), we have an order of operations convention so as to avoid ambiguity. Does 1 + 2x4 mean add 1 and 2 to get 3, and then multiply by 4 to get 12? Or does it mean 1 added to the product of 2 and 4, or 1 added to the result of 2x4? The latter gives 1 + 8, or 9, which is the correct answer. (This may surprise some of you.) Autopad uses a different understanding (the one I first described, going from left to right) as do some earlier and even existing calculators. There may be some benefits to such a system, but I feel strongly that they are outweighed by disadvantages. In any case, I didn't get far with this program. In fact, I exited the program in a graceless fashion which left the new function key settings of the program in place of the old. Thank goodness for Marvin Mallon's book which supplied me with the Call needed to reset the function keys to their original settings!

Documentation-wise, the instructions are well-written except for some typos, spelling errors and incorrect grammar, but in today's climate of semi-literacy, probably not too much worse than average.

continued on page 155

NEW PRINTERS ADDED! FIND YOURS BELOW. Good This Month

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C ITOH Prowriter 1550-8510, NEC 8023-8025, APPLE DMP-IMAGEW	1/2 x 18	$15/2	$42/6	$ 78/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
C ITOH STARWRITER F-10-40 / DIABLO HYTYPE II — Carbon Film Black	5/16 x 130	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
DIABLO HYTYPE II — Fabric Black	NOT EZ LOAD 5/16 x 17	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$21/3	$78/12	$432/72
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Carbon Film - DWP 210 (Hytype II) Black (1445)	5/16 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
DW II, DWP 410-510, RICOH 1200-1300-1600 Black (1419)	1/4 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
Red, Green, Blue, Brown Colors (1419)	1/4 x 130	$21/3	$72/12	$414/72	$6 ea 3-11	$5 ea	12 or more	$30/6	$54/12	$234/72
Fabric (Long Life), DWP 210 (Hytype II) Black (1458)	5/16 x 17 NOT EZ LOAD	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$21/3	$78/12	$432/72
DW II, DWP 410-510, RICOH 1200-1300-1600 Black (1449)	1/4 x 25 -	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$21/3	$78/12	$432/72
DMP-100, LP VII, COMMODORE 1525, GORILLA BANANA (1424)	Inker Loop	$18/2	$51/6	$ 96/12						
DMP-200, 120, (430 Inserts & Reloads Only) (1296) (1483)	1/2 x 20	$20/2	$57/6	$108/12	$7/1	$7 ea	2 or more	$15/3	$54/12	$288/72
DMP-400-420, LP VI-VIII, PANASONIC KXP-130 - 1093 (1418)	5/16 x 14	$15/2	$42/6	$ 78/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
DMP-500 (1482)	1/2 x 20	$22/2	$63/6	$120/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
DMP-2100, TOSHIBA P1340-1350- 1351-351 (1442)	1/2 x 20	$15/2	$42/6	$ 78/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
LP-I-II-IV, CENTRONICS 730-737-739-779 (Zip Pack) (1413)	9/16 x 16							$12/3	$45/12	$252/72
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MX-FX-RX 70-80, IBM PC (Standard Paper) LX80 (5/16 x 7)	1/2 x 20	$14/2	$36/6	$ 66/12	$7/1	$6 ea	2 or more	$15/3	$54/12	$288/72
MX-FX-RX 100, IBM PC (Wide Paper)	1/2 x 30	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$18/3	$66/12	$360/72
NEC Spinwriter-Carbon Film -2000-3500 (Reloads BCCOMPCO Only)	5/16 x 145	$21/3	$78/12	$450/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
-5500-7700 (Can Reload Most Types)	1/4 x 145	$18/3	$60/12	$342/72	$5 ea 3-11	$4 ea	12 or more	$24/6	$42/12	$234/72
-Fabric -2000-3500 (Can Reload All)	1/2 x 14	$18/2	$51/6	$ 96/12	$8/1	$7 ea	2 or more	$15/3	$54/12	$288/72
-5500-7700 (Can Reload All)	1/2 x 13	$15/2	$42/6	$ 78/12	$8/1	$7 ea	2 or more	$15/3	$54/12	$288/72
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P3	1/2 x 27	$30/2	$84/6	$156/12	$8/1	$7 ea	2 or more	$18/3	$66/12	$360/72
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ML-80-82-83-92-93 (Call for ML-84 Prices)	1/2 x 16	$21/6	$36/12	$198/72						
MANNESMAN-TALLY MT-160	9mm x 11	$19/2	$54/6	$102/12						
MT-180	9mm x 13	$20/2	$57/6	$108/12						
-Spirit 80 (SP80) COMMODORE 1526 (Multistrike)	1/2 x 35	$16/2	$45/6	$ 84/12						
PANASONIC KXP-1090-1091-1092	Inker Loop	$20/2	$57/6	$108/12						
BROTHER HR-15-25-35 / COMREX DX-15, II — Carbon Film (Multistrike or Correctable)	5/16 x 82	$18/3	$60/12	$342/72						
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Tandy Reviews continued from page 152

and simple. Read it and believe it. Don't experiment too much with the process. Time is the biggest variable that you will have to work out for your ribbon type. I can't say enough to praise this product! If your ribbon costs just $6.00, 12 re-inkings will more than save the cost of the MacInker! How often do you run a ribbon until it gets so faint that you have to strain to read it when you are doing rough drafts? Now it is so cheap to use a new ribbon that you can change it as often as you want and not worry about the cost. The MacInker is one of the best things to happen to the computer owner in a long time.

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(503) 297-2321

Lescript Another Look

Last year we published a review of LeScript by Anitek in Melbourne, FL. As it was stated then LeScript is a whale of a word processor. For my money it is one of the top two available for the 8 bit machine. One of the areas that sets LeScript apart is the constant effort on Anitek's part to stay current with the market. I have seen at least one survey of owner/users to see what they would like included in the program as revisions were made. In the owner's newsletter, *Nibbles & Scribbles*, the results were shown and most of the changes made over a short period of time.

LeScript is available for--are you ready for this?--IBM PC, XT; Tandy 1000, 1200, 2000, and Models III, 4, 2, 12 & 16; Model 4 & 2 CP/M; Max-80 and LNW. On top of this impressive list LeScript services over 120 printers and the drivers are included...FREE! The availability for the IBM and compatibles is about enough to change my mind about a MS-DOS word processor. I can't wait to run an evaluation of the MS-DOS version on my new Model 1000. According to the documentation the color looks great.

One of the reasons for this look back is the latest version (1.66) of LeScript. This version automatically accesses the available memory on the SUPERMEM board. I have 778K in the Model 4 on my disk and LeScript shows 734464 bytes of unused memory! That adds up to more pages than most people will ever need to work in memory at one time. This is part of the constant updating that Anitek is doing for LeScript.

I won't go into the mechanics of LeScript here as we did that some time ago (*Computer Shopper* July '84). Suffice it to say that all the whistles and bells that you are likely to need in a word procesor and more are in this package. If you have added a memory board to your computer you will fall in love with the latest version.

By the way, if you are a tire kicker and a demonstration ride type, Anitek has a trial size copy of LeScript. Send for it.

LeScript
$129.95

Anitek
P.O. Box 361136
Melbourne, FL 32936

Sum-Up The Quick Calculator

AlphaBit Communications offers Sum-up for use in the TRS 80 Models I, III and 4. The program is installed from DOS and then called up from within what ever application you are using. When summoned by using <CTRL> C or <SHIFT> Down Arrow C, Sum-up appears in a window

continued on page 154



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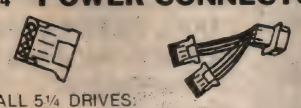
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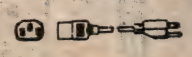
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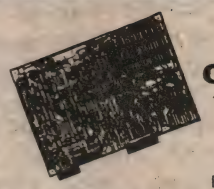
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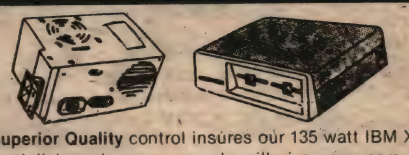
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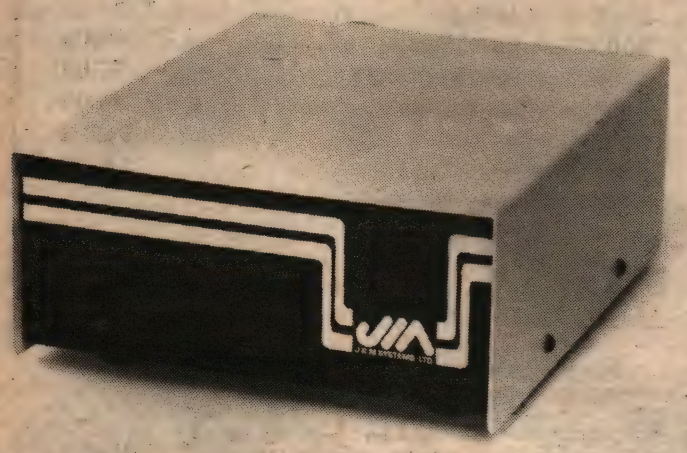
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New Hard Drive For Color Computer



J & M Systems announces their new hard drive for the Color Computer, available in 5, 10, and 20 MByte capacities. In addition to the obvious advantages of increased disk access speeds and a vast amount of storage, J & M System's hard drives boast many innovative features. For example, you may boot OS/9 directly from JDOS--no intermediate boot floppy is required. Our software can run with virtually any Winchester drive with a ST412 type interface. The drives may be either partitioned in up to 7 logical units, or left as one large logical unit, with OS/9 restriction that the maximum partition size is 7 MBytes.

The COCO hard drive systems are complete with case, power supply, cables, OS/9 drivers, and instructions. The drives run under the OS/9 operating system, and also require J & M System's JFD-CP disk controller.

The 5 MByte system uses full size 5-1/4" drives and is $495. The 10 MByte system uses half size 5-1/4" drives and is $650. The 20 MByte system uses 3-1/2" drives and is $795.

COMPUTER SHOPPER will publish a review of these drives in a future issue.

For additional information contact J & M Systems Ltd., 15100-A Central S.E., Albuquerque, New Mexico, 87123, (505) 292-4182. ●

Tandy Reviews continued from page 153

on the screen. Operations include addition, subtraction, division, multiplication, change of sign, labeling and conversion to HEX. The math is accurate to 8 places and switches to scientific notation after that. The output can be sent to the printer or on the screen only. The interrupted program waits patiently for you to finish your math and then keying "X" returns you to the application without any loss of data.

There are times when I find myself looking for a calculator while working on a data base or word processor. A quick <CTRL> C would produce a screen calculator that would do the math and then disappear until needed again. Sum-up is available for Model I and III on LazyDos and can be moved to MULTIDOS, TRSDOS, LDOS, DOSPLUS or NEWDOS 80. The Model 4 version is on a TRSDOS 6. data disk and can be copied to where you want it.

When installed Sum-up uses 5.5K of memory. Using the program I found that it works just as advertised. I could not hang it up or cause a problem with the application program that I was using. Some of the ones used were PROFILE, ALLWRITE, LESCRIPT, SCRIPSIT, SUPERSCRIPSIT and PROFILE III PLUS. The documentation is very short and sweet. Nothing is left out or to the imagination. A short page to help you set it up, a cue card of commands and you are on your way.

For those that like the nice little gizmos Sum-up would be a swell stocking stuffer.

Sum-Up
Specify Model I, III or 4
$24.95
AlphaBit Communications
13349 Michigan Avenue
Dearborn, MI 48126
(313) 581-2896 ●

```
. . . . . .
.                          .
.  >>>>>>  SUM-UP  <<<<<<  .
.--------------------------.
.  DINNER                  .
.            46.35         .
.  FLOWERS                 .
.  +         21.90         .
.  =         68.25         .
.--------------------------.
.  +   68.25               .
.--------------------------.
.N=NEW :∂=+/-: P=YES : eXit.
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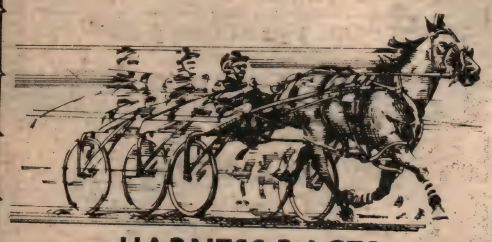
This is an example of how the SUMUP window appears on your CRT. The bottom line lists usable commands.

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Quick Look continued from page 152

In fairness to the program itself, I should note that it seems to offer promising features, including built-in functions for summation and the like, range copying, etc. And, as for the function key settings, I subsequently found that a graceful exit (using the Exit option #8 on the Menu) would have reset the settings for me.

In view of all the above, I cannot recommend purchase of at least the spreadsheet AutoPad until some change or new information is forthcoming on how to get it to work properly. True, I found that if I were very careful, the program could be made to work. That, however, requires a lot of patience and care in following the instructions. Still, I will be happy to update readers in a future column should I get the program to work. After all, as I mentioned before, a lot of work has clearly been put into some of these products. I would hate to dismiss such a package without giving CSA a chance to redeem itself or to answer questions.

The big questions, besides the problems I experienced with AutoPad, involve ones of utility. Would you keep the programs resident in memory, eating up RAM? Would you just load a tape each time? Are you willing to settle for the slowness of Basic? Is a tape system for records even viable nowadays? Or, are you on a tight budget and in need of programs, with saving money your main concern? Are you willing to be super-careful in using such programs so as not to cause a crash? Some of these programs may interest newer users with little to compare against and not much money to spend, but until the problems are corrected, I cannot make a recommendation for the entire package, nor for AutoPad alone. The AutoPen program alone might merit a closer look, however, especially if you plan to do mostly lighter writing.

Auto Pad, $29.95, AutoPen - new price not known, AutoPack $69.95. (These are new, lower prices as of Nov. 1985)

For further information contact Chattanooga Systems Associates, PO Box 22261, Chattanooga, TN 37422, Phone (615)892-2339.

Exploring the Radio Shack Model 100

Marvin Mallon's book is a fine book to aid the beginning or intermediate user of the Model 100. In fact, there is some material which even some of you advanced users might be interested in. It covers setup of computer for use, discussion of the built-in programs (Basic, Text, Telcom, Address, Scheduler) and how to use them properly. Some light mention is made of shortcomings, but the author offers a few programs to improve the built-in programs, particularly TEXT. I was pleasantly surprised to find lots of little extras such as discussion of the nature of LCDs, tips on producing inverse video (using CHR$), and an exploration of peripherals and ports included with the TRS-80 Model 100.

Unlike Dr. David Lien's Model 100 book (which I had purchased at my local Radio Shack), Mr. Mallon's book does not have the gratuitous "cute" stuff and cartoons. Not that Lien's book wasn't helpful and useful, nor that some people don't in fact like such cartoons. But Mallon's book has a good deal of detailed information. In fact, I put it to immediate use after reviewing AutoPen (see above review) in learning how to reset the function key settings. If it was in Lien's book as well, I could not find this specific information that I needed.

While Mallon's 166-page book is not as big as Lien's, I found it useful in terms of specific information, such as names and addresses of manufacturers of Model 100 products, publishers of magazines for the 100, and so on. While some of the information is already outdated, it should provide a good start to many. Thus, Creative Computing, mentioned in the book, has just folded (and with it, a column I had there myself!), and even though the Portable Computer Support Group's listing is out of date in terms of its current offerings, one could contact the company and then learn of what the company now has available, such as Write Rom, Lucid and Super Rom.

The book comes with useful appendices and an index, and it costs $16.95 plus $2 shipping when purchased directly through Mr. Mallon. Readers may recognize the name of fellow *Computer Shopper* columnist Fred Blechman among those who assisted in the book. In short, if you already have a Model 100 book, I don't know whether you would want to spring for another (although this is a good second one to have!), but if you do not have one, then this is a fine one to be your first Model 100 book--and perhaps your last!

Exploring the Radio Shack Model 100, by Marvin C. Mallon, CBS Computer Books, $16.95 (plus $2 shipping).

For further information contact Marvin Mallon, 6914 Berquist Ave., Canoga Park, CA 91037, Phone (818)348-3662. ●

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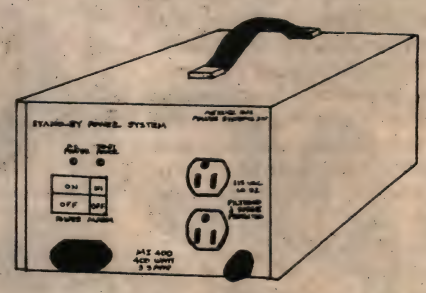


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Baudville, publisher of quality graphics and animation software, announced the release of Prince, the multi-color printing package for black and white printers. Baudville's new Prince software and ribbons produce up to 80 full color prints for paper or transfers to cloth using an Apple computer.

Colorful custom T-shirts, greeting cards, bumper stickers, stuffed toys, banners, letterhead, labels/stickers and more can be created with Prince and the Prince library of art and font styles. Prince will also "capture" any standard or double hi-res picture for editing and printing.

Prince features special "ribbon saving" software with automatic paper control for perfectly aligned color prints. Four (4) color ribbons are included for the following printers: Package #1 - ImageWriter, DMP, C.Itoh 8510/Prowriter, 8510SC, Nec 8023; Package #2 - Epson MX 80, RX 80, FX 80.

Prince comes complete with Craft Kit. Apple users can create bright iron-ons (test cloth included), personalized disk labels or bumper stickers on the special label stock, or letterhead on the classic Prince paper (with matching envelopes).

Prince (Apple format $69.95) and Prince refills are available at specialty stores nationally or direct from Baudville.

For additional information contact Baudville, 1001 Medical Park Drive, SE, Grand Rapids, MI 49506, (616) 957-3036.

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Software Protection Techniques Exposed!

Now, for the first time, owners of Apple II series computers can learn all about the tricks and techniques used to protect Apple software and make it uncopyable. The information is available in a new monthly publication called *Apple Software Protection Digest* that is being published by Redlig Systems, Inc. The annual subscription price of the digest is $24, but anyone who is interested can receive the first issue free by simply writing to Redlig Systems, Inc.

Every month, the digest includes articles on how to backup and/or unprotect software. In addition, for those who want to learn how to protect their own software, the Apple Software Protection Digest includes articles on various types of protection schemes and step-by-step instructions on how to implement them. And for those people who want to get a thorough understanding of the whole software protection field, a monthly Protection Tutorial traces the history of software protection as it has evolved on the Apple II and shows you how to implement the various protection schemes that have been used over the years.

The digest is filling a need that has been growing tremendously during the last few years. Too often, purchasers of computer software get stuck. They buy a program only to discover afterward that because of the copy protection scheme included, it can't be used with a particular piece of hardware such as an expanded capacity disk drive, RAM disk, etc. Spelling checkers are a good example of this. They're

Continued on page 159

Public Domain Software For Schools

The Public Domain Library of the Duncan Institute has introduced a School Starter Library of 174 computer programs suitable for use in schools.

Programs in this special collection over Arithmetic, Spelling, Reading, Math, Music, Biology, Chemistry, Computer programming, Energy, Geography, and many more exciting topics. These programs will run on Apple computers using Integer and Applesoft BASIC.

Selected from the Duncan Institute's Public Domain Library Catalog of over 2,000 programs, the School Starter Library will unlock new worlds for teachers and their students while bringing new life to their Apple computers.

The entire School Starter Library is only $69.95 (about 40 cents a program) plus $4.00 shipping. It can be ordered from:

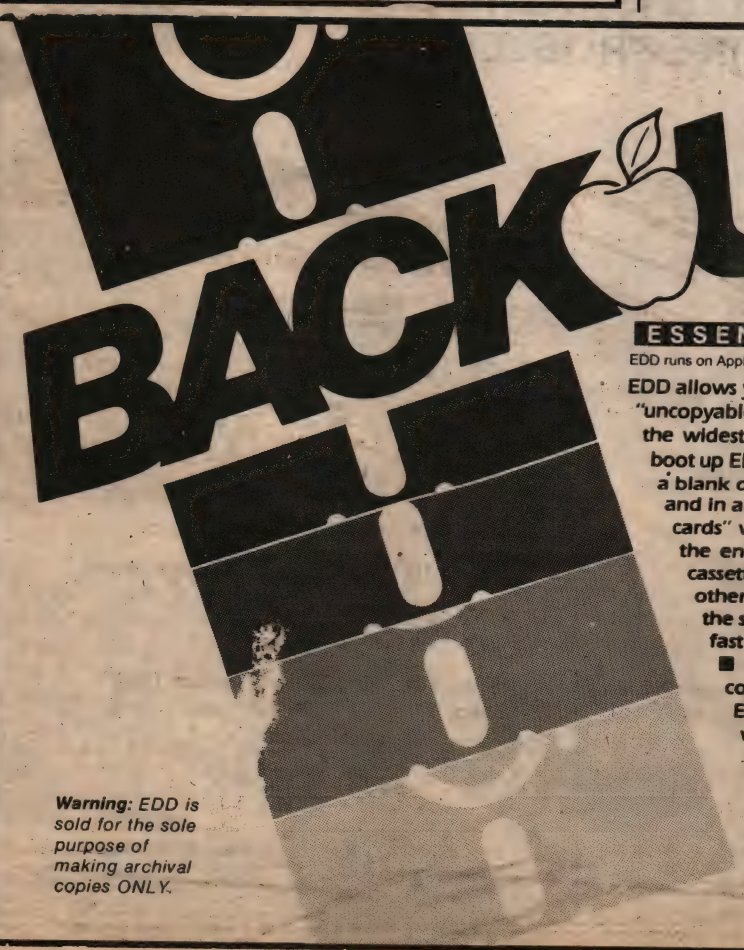
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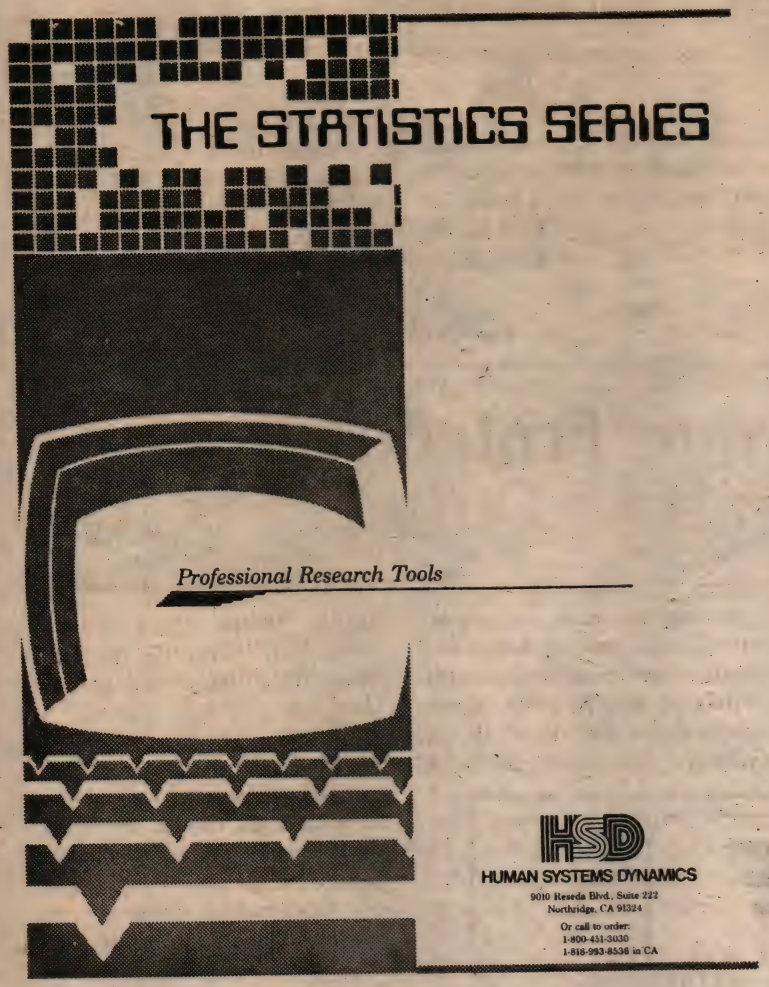
EDD allows you to easily and quickly make back up copies of your "uncopyable" Apple disks. ■ Since EDD has been preset to copy the widest range of copy-protections possible, you just simply boot up EDD, put the disk you want to copy in one disk drive and a blank disk in the other (EDD will work using one drive also) and in about 2½ minutes a copy is made. ■ Unlike the "copy-cards" which only copy "single load" programs, EDD copies the entire disk. This would be similar to hooking up two cassette recorders, playing from one, and recording to the other. ■ We have even included an option so you can check the speed of your disk drives because drive speeds running fast or slow can damage disks and cause other problems. ■ We publish EDD program lists (information about copy-protected disks) every couple of months, which EDD owners can receive. The current list is included with the purchase of EDD. ■ The bottom line is this; if EDD can't copy it, chances are nothing will.

$79.95 Ask for EDD at your local computer store, or, *to order direct;* send $79.95 plus $2 shipping ($5 foreign). Mastercard/Visa accepted. *Prepayment required.*

***Warning:** EDD is sold for the sole purpose of making archival copies ONLY.*

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Statistics Series — Statistical Software



Human Systems Dynamics of Northridge, California is now distributing its new 20-page catalog with information on their entire line of statistical analysis programs. To celebrate, Dr. Virginia Lawrence, Chief Executive Officer of the company, has called for a 20% discount on every program purchased until December 1, 1985. Collectively titled The Statistics Series, these programs represent the largest group of statistical software packages available for the Apple II and the IBM PC.

"Our new catalog contains pictures, graphs, sample printouts, and all the information most requested by our customers," states Dr. Virginia Lawrence. "We feel both the catalog and the discount are firm testimony to HSD's commitment to excellence in serving the needs of our customers."

The programs in The Statistics Series were designed to be fast and easy to use. No previous computer experience is necessary. By simply following the step-by-step examples provided in the documentation, users can begin running their first analysis in a matter of minutes.

Human Systems Dynamics provides excellent support to its customers. There is a toll-free number (1-800-451-3030) for technical advice. In addition, an informative newsletter with tips and suggestions for using the various statistical packages is sent free of charge to all program owners.

To obtain a free catalog, which lists prices and system requirements, simply write Human Systems Dynamics, 9010 Reseda Blvd., Suite 222, Northridge, CA 91324-3971, or call toll-free 1-800-451-3030. California residents call 1-818-993-8536.

Mention that you read about it in the *Computer Shopper*. ●



Mac-Like Desktop
continued from page 62

files. By moving the icons and selecting commands from pull-down menus the user can format and erase disks; and move, copy, delete, lock/unlock, rename and sort files. The program provides useful information, such as the size of each file, whether it is locked or unlocked (for recording additional information), a list of storage devices connected to the system and available memory of each device.

Mouse Desk's program selector function includes several advanced features that optimize the use of mass storage devices on the Apple II. For example, when used with Apple's Memory Expansion Card, the utility automatically reloads itself and any previously designated combination of programs as soon as the Apple II

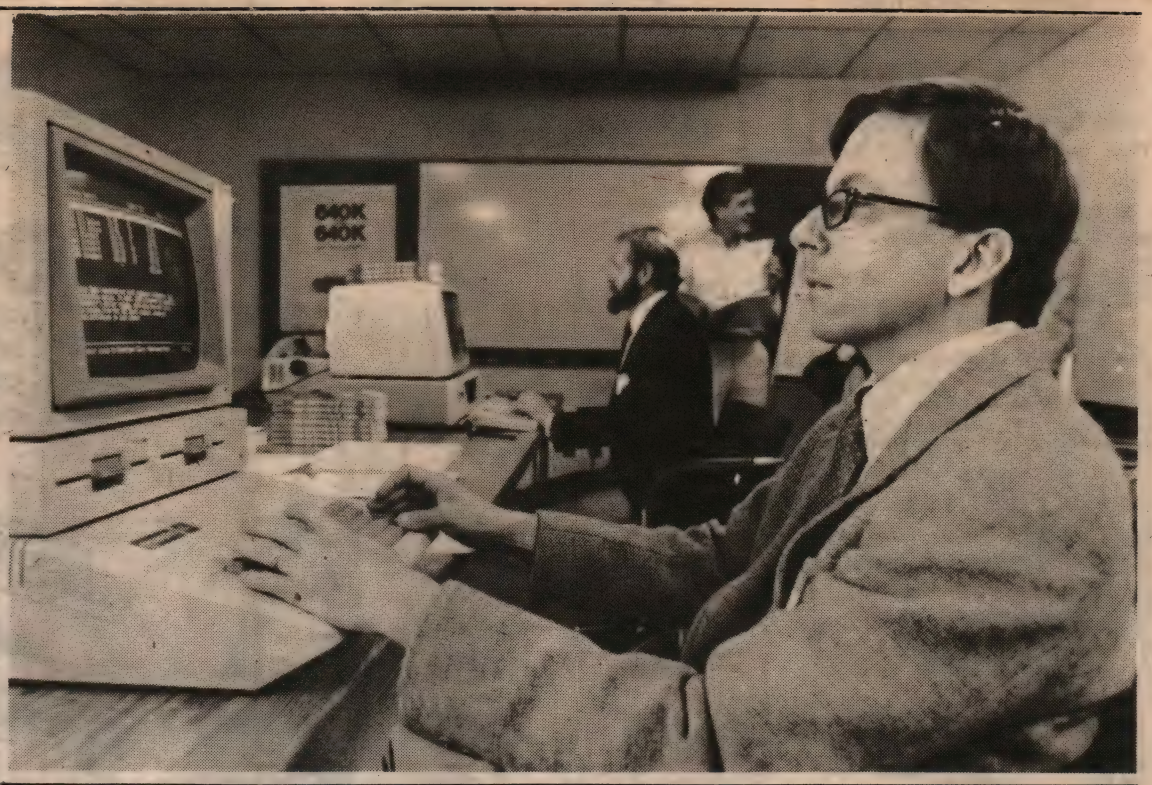
continued on page 158

Souped-Up Apple II Beats IBM in Drag Race

Appleworks author Charles Rubin scored an unqualified "shut down" in Monday's 640K vs. 640K drag race with fellow author and computer columnist Andrew Williams at Silicon Valley's Decathlon Club.

Williams, author of Lotus 1-2-3 From A to Z, tried, and failed, to produce a sales report during the half-hour demonstration on an $2,886 IBM PC system using Lotus's Symphony

continued on page 159



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Mac-Like Desktop

continued from page 157

is turned on. Because the programs remain in the card's memory, switching between them is fast and easy.

Loading programs from hard and floppy disk drives is also a fast, one-step process. The user simply selects a program from the "Run" menu, which can contain up to 32 items. Mouse Desk quickly finds and loads the program from any of the storage devices connected to the computer.

Mouse Desk also provides a simple hierarchical filing system that uses a file folder icon instead of sub-directories and pathnames. The program will sort individual files as well as folders by name, date, size, or type.

Mouse Desk runs on either Apple IIc or Apple IIe equipped with an extended 80-column card and one floppy disk drive. An Apple II compatible mouse, such as AppleMouse II, is strongly recommended; however Mouse Desk can also be operated from the keyboard.

Mouse Desk is available in two versions. A copy-protected version, priced at $39.95 (U.S.), allows the user to load files on mass storage devices but requires the master disk to be in the system's floppy disk drive. A non-copy-protected version, priced at $69.95 (U.S.), is designed for people for whom the key disk system is inconvenient--for example a user who installs Mouse Desk on systems at home and at work. Both versions include a 90-day warranty from International Solutions.

The program is now available at leading department store computer retailers and selected computer specialty stores in the U.S., Canada, Australia and New Zealand. Versions for major European languages, which will be marketed by Apple Computer, will be available later this year.

For additional information contact: International Solutions, Inc., 910 West Maude Avenue, Sunnyvale, CA 94086. (408)773-0443.

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Software Protection
continued from page 156

frequently difficult or impossible to use with non-standard or hard disk drive. As a result, they're usefulness is more limited than it could be.

Limitations on program use are not the only reasons why computer owners want to back up their programs. People also want to protect their investment. If something goes wrong with a protected disk, you either have to send it back to the manufacturer for replacement, or after the warranty expires, buy another one, if you can. Because there are software publishers dropping out of the business, some computer users may find themselves stuck with a defective program that can't be fixed or replaced.

In any case, computer users could be without the user of your program for a few days to a few weeks at best. For game programs, that's an inconvenience, but generally not critical. But for business-oriented software, that could be critical.

Apple Software Protection Digest will include articles on both game and business software. In addition, includes reviews of books, software and hardware that are pertinent to the software protection field.

For further information contact Redlig Systems, Inc., 2068 79th Street, Brooklyn, New York 11214, (718)232-8429.

Mention that you read about it in the *Computer Shopper*. ●

Souped-Up
continued from page 158

program even though Rubin completed most of the job easily using the same data on a $1,756 Apple II souped up by Applied Engineering of Dallas.

Ironically, Williams was using Symphony 1.1, a recently released version of the product supposed to be easier to use. News that Lotus had recalled Symphony 1.1 because of numerous bugs broke the day after the Silicon Valley drag race.

But Williams took responsibility for the loss, saying "I'm, really more of a 1-2-3 expert than a Symphony expert. Symphony is an incredibly complex program. The bugs may have contributed to my problems, but Appleworks was the obvious winner for the tasks we attempted."

Williams, A Ph.D and the author of two books about spreadsheets on the IBM PC, teaches classes in Symphony and 1-2-3.

The two computer writers used identical files created by Appleworks to try to prepare the sales report while being interrupted with mock "telephone calls" during the half-hour demonstration.

"To that extent, the test favored Appleworks," winner Rubin said. "But the tasks were ones that any integrated program should have been able to perform."

The point of the exercise, according to Applied Engineering President Dan Pote in Dallas, was to show that "the Apple II is the best computer in the world."

"Hasn't anybody out there noticed that you don't have to take classes to learn how to run your business with Appleworks?" Pote asked.

For further information contact Applied Engineering, P.O. Box 798, Carrollton, TX 75006.

Mention that you read about it in the *Computer Shopper*. ●

Probots and People
continued from page 72

market for high-technology electronics such as their robots, so, along with another Japanese company, they have created TTC, which is short for Tomy Technology Corporation.

TTC has introduced some interesting products, including telephones that require only a word to dial a certain number (like "Mom" or "Office") and a cassette deck that lets you sing along with the music and hear yourself accompanying whatever group you like best. One of TTC's products, however, is a small robot named Hearoid.

Hearoid is, quite simply, a Verbot/Omnibot mix. He has all of the features of Omnibot, but he can also recognize spoken commands from the same remote control unit that you use to program and control him with in the manual way. It doesn't make abundant sense to me or my business partners why anybody would want to spend an extra $100 over the price of the Omnibot just for the power to say a particular command rather than push the button for it. After all, the buttons to control Hearoid are right there on the keypad. Of course, it's fun to play around with voice recognition, but I figure if you're going to do something, you might as well do it all the way and let the user rough it without the buttons and therefore knock the price down as well.

The Hearoid does have some real pluses over both the Omnibot and Verbot, however.

continued on page 160

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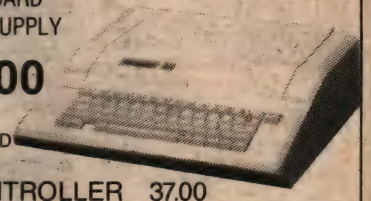
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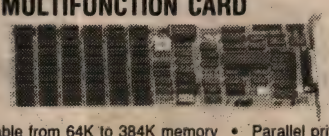


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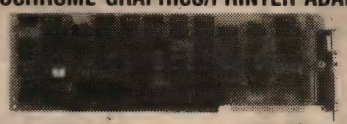


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Timex/Sinclair
continued from page 77

you at all times how many letters have already been printed.

While I am not tempted to give up MSCRIPT as my word processor in favor of VIEWord, it is a well thought out package and has performed well once I learned how to use it properly. I did have a bit of a problem at first due to a little ambiguity in one of FORMail's prompts. When loading a VIEWord file, you are requested the size of the file. I interpreted this as being the number of lines contained in the file. This caused loading errors until I figured out that what was required was the size of the line in the VIEWord file. One problem solved! A second problem arose when I started printing the letters. I have my printer set to send an automatic linefeed after each carriage return, as is required by my MSCRIPT software. When printing my letter, I was getting double spaced documents until I loaded my personalized driver and made a slight modification in the program. This solved most of the double spacing, except in the inside address portion. This was now being printed on one line. After examining the program, I found where the inside address was printed and made some more modifications. It works fine now, except that there must be one linefeed that I missed, as I have to declare my documents to be one line shorter than the 66 lines I know to be the correct setting. In all fairness, however, it should be mentioned that this will only occur if you have your printer set to send this extra linefeed. The vast majority of you will not have this problem.

I mentioned a fourth program as being part of this package. It is named JOURNAL and will provide a weekly appointment calendar for as many weeks as you desire. This is the only program which will not work on the T/S 2040 printer and does not interface with the other three.

I have seen more sophisticated programs, with more frills, but at $25.00 for the package, this is a good buy for those requiring mailmerge capabilities. All of the programs (including BANNERS) transferred easily to the A&J microdrive system, including the SAVEing and LOADing of the respective files.

What about the BANNERS program? It was exactly what I had wanted and more. It does indeed produce full size banners on an 80 column printer, but the flexibility included was more than I expected. The program is in two parts. The first part allows you to send control codes to adjust the size of your banner. I was able to create half size banners and narrower characters by sending the proper codes to my printer. This truly enabled me to match the size of the banner with the needs of the location it was going to be displayed in.

Like with the VIEWord package, my linefeed setup caused the expected double-spacing, so I substituted my own driver for the one included. I found that the double-spacing returned when I sent the control codes, so I set up my microdrive wafer with the print driver recorded twice. After the control codes are sent, I reload my own driver and all is fine.

Perhaps it is because I started in a like manner, I am glad to see that folks like Jim Clatfelter are still with us. You may contact Jim at 3361 Sand Ridge Road; Placerville, CA 95667. Also don't forget to check out the Sinclair section in the classified section. Perhaps you will be the one to discover another goodie.

For those who asked about the next installment in the Sound on the Sinclair series--it is on the way. I am now putting the final touches on the tutorial and hope to have it herein shortly. Also in the works are (at least) two columns relating solely to T/S 1000 related products. ●

Probots and People
continued from page 159

It's PA-type system is superb. When you speak through Omnibot, there's some static and it's not very clean as to what's coming through the speaker. Hearoid, however, serves as an excellent way to voice whatever's on your mind since your words can be heard loud and clear. In addition, Hearoid is equipped with the accessory panel found on Omnibot 2000 which allows the robot to use the add-ons mentioned earlier. Finally, TTC has come out with an attachment which allows you to put a Black and Decker Dustbuster (included with the attachment) onto Hearoid so he can perform simple vacuuming chores. Of course it's easier to do it yourself, but it's more *fun* when you let Hearoid do it

The Importance of the Toys

As I mentioned in last month's column, toys are a very important part of the infant personal robot industry. They help people grow accustomed to the idea of robots in the home and generate interest in the field. Toy companies such as Tomy are going to be sowing the seeds for a new generation of robots, and although these can't perform too many useful tasks around the home, they're a lot of fun and it should be exciting seeing what kinds of new inventions Tomy, TTC, and other entertainment-oriented companies will be introducing over the next couple of years.

Tim Knight publishes ***Personal Robotics Magazine*** and is the President of Robot Center, the first personal robot store in the Silicon Valley. You can write him at P.O. Box 61046, Palo Alto, CA 94306-1046. ●

MacUniverse
continued from page 148

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Scotts Valley, CA 95066
1-800-255-8008
Suggested list price — $79.95

Deja Vu
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MacNifty Switch
Kette Group
Suite 110
13895 Industrial Park Blvd.
Minneapolis, MN 55441
1-800-328-0184
Suggested Price:
AB Switch — $34.95
ABCD Switch — $54.95

Clapp, *Doug Clapp's Jazz Book: The Quintessential Guide to Mastering Jazz on Your Macintosh* — $17.95.

Aker, *MicroSoft Basic Programming for the Mac* — $17.95.

Scott, Foresman and Company
Professional Publishing Group
1900 East Lake Avenue
Glenview, IL 60025
1-312-729-3000

Social Climber available on Compuserve MAUG SIG, SL5. File name SCLIMB.BIN, PPN 70167,3337.
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1091 ..... $228
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- 1 Dr, 22 MB $3499
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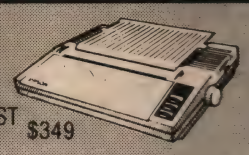
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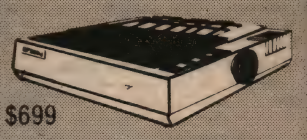
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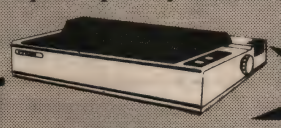
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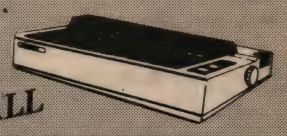
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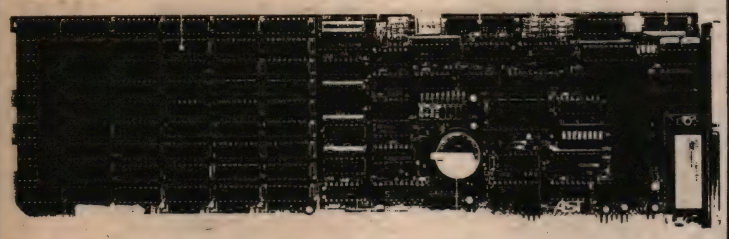
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Buy a Printer

continued from page 80

paper-edge so margins must be allowed for. The "normal" full line size with margins is about 60 characters wide.

Calculating the page size from top to bottom a full page of 10 point type with average typewriter spacing, holds 66 lines. It is customary to leave large margins on the top and bottom of the page as well as additional space for headings, salutations and titles so you almost never use 66 lines. Using a "worst case" figuring, 60 lines will be the measure of page length.

Now multiplying 60 characters per line by 60 lines we get 3,600 characters per page. If the printer can print 80 CPS, divide 3,600 by 80 for a theoretical printing of the page in 45 seconds. Not bad, but not entirely accurate either. If you actually time the dot matrix printer, an average of 53 seconds would be usual. The printer needs additional time to get the data from the computer and to move the paper and the print head into printing position. Although almost impossible to calculate, allowance for that time is necessary.

At the end of each page the printer must stop printing, advance the paper to the next page, move it up to the top margins you have set into the program and move the head into printing position. Allowing an additional 10 or 12 seconds for the operation would be more realisitc.

When manufacturers give the speed of printers in characters-per-second (CPS) the timing is done from the instant the first pin is fired for the first character on a line, until the moment the last pin is fired for the last character on one line! No consideration for the time required to move the head into its first print position nor the time required to move the paper to the next line is given. This of course gives a false speed much faster than the printer actually operates. This is not a practice of one manufacturer; *all* do it and don't inform the public of the calculation methods. Few sales people realize they are quoting false speed claims. In my tests while timing a daisy wheel printer whose manufacturer claims a print speed of 15 characters per second (or 4 minutes per page) I found 4.5 minutes to print a page more in keeping with my realistic expectations.

Being aware of how many pages you must print for your documents is essential. With your own calculations in hand you will be able to select a printer having the speed needed to do your jobs. Faster printers cost more, so you should calculate your required speed based on average jobs you normally do. For example, I have two printers. One is an

continued on page 165

Plains & Simple

continued from page 107

stated. For example, a customer could reduce or completely eliminate costs for service bureaus, forms, statement preparation and write-ups. The software will also allow accountants and CPAs to spend more time on financial review and analysis.

Plains & Simple carries a suggested retail price of $695. The package includes a general ledger, accounts receivable and accounts payable functions. Through these three functions the customer can access the general journal sales/cash receipts journal, purchases/cash disbursements journal, customer and vendor ledger cards and reports.

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- Print financial statements at any time during the year
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Great Plains Software a licensed developer of software for the Apple Macintosh, was founded in 1981 and is headquartered in Fargo, North Dakota.

For further information contact: Great Plains Software, 1701 S.W. 38th St., Fargo, ND 58109 (701)281-0550

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Printer Switches continued from page 80

ing this interchange of wires 2 and 3 between computer and printer is the most frequent cause of serial printer interfacing problems. When using typical RS-232C cables designed for modem use, which are usually wired straight-thru-pin-to-pin, a device called a "null modem adapter" can be used to adapt the cable to printer use. It simply interchanges wires 2 and 3.

Parallel Switch

Figure 2 shows only DATA STROBE (1), BUSY (11), SELECT (13) and ERROR (32) are switched. All eight DATA lines (2 thru 9), and the ACKNOWLEDGE signal (10), are directly wired. This will work with 95% of the printers commonly used with microcomputers. Among the exceptions, which also need the DATA lines switched, are some Brother and Comrex printers, apparently due to the DATA lines being at different voltage levels.

Wires 12 (Paper Out), 16 (Signal Ground), 17 (Chassis Ground), 27 (Ground) and 33 (External Ground) are all connected together. The eighteen other wires, as noted in Figure 2 are not connected at all. It is particularly noteworthy that Pin 18, which on some printers carries +5 volts, but on some other printers is a ground, is wisely not connected!

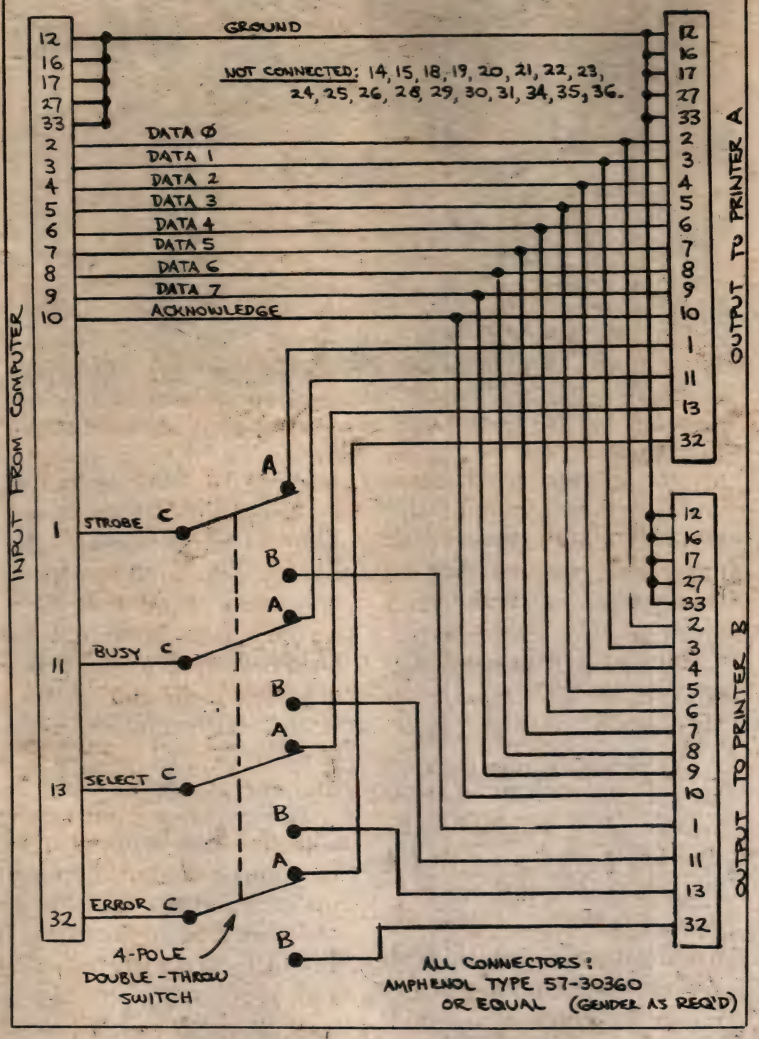
Do It Yourself

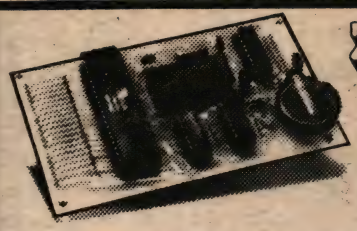
The connectors for either of these selector switch configurations are available at large (and many small) computer hardware suppliers, including many *Computer Shopper* advertisers. The enclosure can be plastic or metal. Layout is not critical.

The "catch" will be finding

continued on page 164

FIG. 2
CENTRONICS PARALLEL A-B SWITCH





Ztime-I

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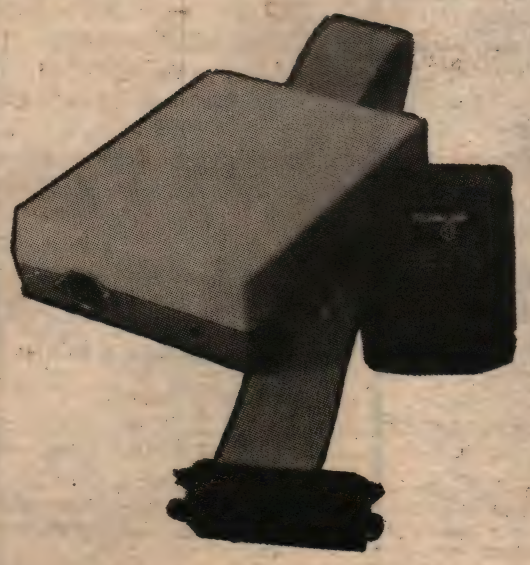
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Printer Switches continued from page 163

the proper switch. For the parallel selector, you'll need a 4-pole double-throw switch ("4PDT"). This simply means a switch that has 4 independent sets of contacts ("4-pole") with two "on" positions ("double-throw"). Sometimes this is called "4-pole 2-position."

A slide, toggle or rotary switch is appropriate, and larger electronic parts suppliers are the best source. Radio Shack, unfortunately, does not go beyond 3-poles. GC Electronics #35-036 is a 4PDT bat-handle toggle switch. Alco Electronics #4200 is a 4PDT slide switch. Centalab #PA-1011 is a 4-pole 2-position phenolic rotary switch with "non-shorting" contacts (also sometimes referred to as "break-before-make" contacts). Most large switch manufacturers offer 4PDT switchers.

Finding the 8PDT 8-pole 2-position switch for the serial selector is tougher, and you'll probably be limited to rotary switches, perhaps with multiple sections. For example, the CTS #T218 is a 2-section non-shorting 8-pole 2-position switch. Centralab #PA-1025 is similar.

You'll need to be very careful not to connect the wires improperly, and also to avoid solder "bridges" between contacts. There are a lot of wires involved, and you will be faced with a spaghetti-like mess unless you are an organized, well-disciplined builder that neatly routes and bundles cables. Neither I nor *Computer Shopper* magazine can be responsible for any inconvenience or damage caused by incorrect construction or incompatible interfacing.

TAB Parallel Printer Switch

Frankly, you should not attempt to build either of these printer selector switch boxes unless you're familiar with electronic construction and the interfacing requirements of your computer and printers. A much safer approach is to buy one of the many such switches advertised in *Computer Shopper*.



Photo 2 — The TAB Printer Switch uses a printed circuit board and soldered interconnections.

I've personally used the TAB Model PSM-C/2P Printer Switch, which sells for $69.95. (See Photo 1.) I even took it apart to check the construction. (See Photo 2.) This is a parallel interface switch, with 4 wires switched, as shown in Figure 2. I used it to switch between my Star SG-10 (in the NLQ near-letter-quality mode) and my Star Delta-10, and I couldn't be more pleased!

According to the manufacturer (TAB Sales Company, P.O. Box 8098, Pensacola, FL. Phone: 800-874-1551), the PSM-C/2P is designed to operate with the standard Centronics parallel interface. It has been developed over a period of several years and has been tested with almost every popular parallel printer and computer on the market.

The switch is built of the highest quality material and is guaranteed against defects in material and workmanship for one year. The circuit board is FR-4 UL-approved epoxy glass with heavy plating to ensure long life. No card-edge or crimped connections are used. Instead two built-in 3-1/2 foot printer cables have each wire soldered to transition connectors on the circuit board, providing positive, trouble-free connections.

A high-quality gold-plated domestic Centronic-type plug is installed at the printer end of each of the cables. A gold-plated Centronics-type jack is built into the top of the switchbox to accept your existing printer cable. Since the switchbox includes the external cables that plug into your two printers, there is nothing else to buy.

The attractive gray case is built of high-impact ABS plastic, and small enough (5-3/4" x 3-5/8" x 1-1/8") to fit any desktop arrangement. I used two-sided tape to hold mine to the desk alongside one of the printers. It could even be mounted on the side of the computer or one of the printers.

Using the PSM-C/2P couldn't be much easier. You plug your printer cable into the switchbox, and plug the cables from the switchbox into each printer. One printer is called "A," the other "B." No external power or batteries are used. You simply slide the switch on the top of the box to either A or B and print away.

I was particularly impressed with the internal construction of this switchbox. A single printed circuit board is used for the interconnections, and everything is soldered. There are no loose wires floating around.

Other Switches

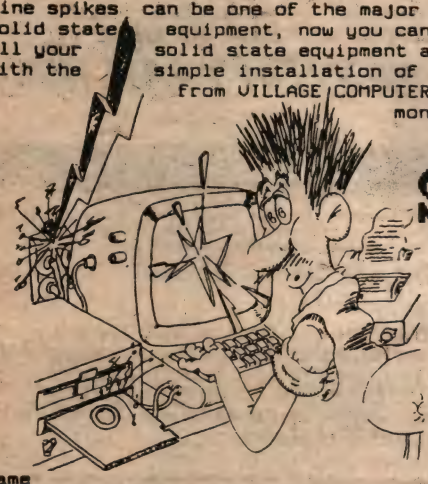
As stated earlier, the PSM-C/2P, since it only switches four wires, works fine in approximately 95% of the cases. However, for those cases where it will not work properly because of incompatibility between printers, TAB has a Model PS-1 ($89.95), which also switches the eight DATA lines.

For serial switching, TAB offers the SR-1 ($79.95). This switchbox includes two six-foot cables. It also has a built-in null-modem switch for one port to interchange Wires 2 and 3 (as described earlier) for modem use. In other words, you can connect a printer to one cable and a modem to the other, and select the one you want with the A-B switch, also setting the null-modem switch for modem use.

When comparing other switchboxes, consider whether they include the external cables (which can cost $20-$40 each extra!) Also, inquire about the internal construction, and select soldered connections, rather than crimped connections or card-edge push-on connectors. ●

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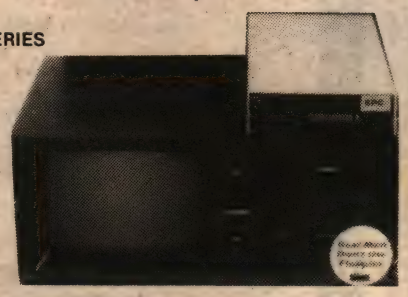
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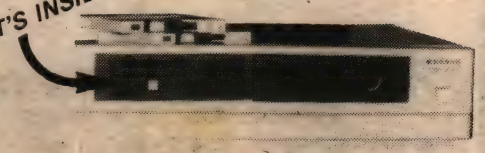
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Buy a Printer continued from page 162

80 CPS Dot Matrix and the other is an 18 CPS Daisy Wheel. Both are enough for the jobs I normally do. If I have to use the daisy wheel to type a complete manuscript for a book the job can take days to do. With the few times a year I need to produce letter quality manuscripts it does not pay me to have a faster (and more expensive) daisy wheel printer.

If you have a number of jobs that must be run on a regular basis and can be printed on a dot matrix printer, be sure you buy one with a great enough speed to do the job in a reasonable length of time. The difference in price between printers operating at 80 CPS and 180 CPS is nominal. However, once you go past that speed the price differential becomes much greater because you must move upward into the field of heavy duty printers.

The development of the laser printer will change our expectation of print speed from computer printers. The first large laser printer, costing about $50,000, could print at a rate of 200 pages per minute. The models being used in large printing volume applications now can print up to 20 complete pages a minute. The cost, between $10,000 and $20,000 is also the price of a large chain printer. The smallest laser printers cost between $4,000 and $7,000 can print about 12 complete pages per minute.

Once you calculate how big your job requirements are you can refer to Table 1 which gives the typical print speed range for various printers.

Printer Duty Cycle

Most people using personal computers at home or in the office do not do production work with their computers or printers. By "production work," I mean very large runs of bills or labels on a regular basis. For most people, the lightweight printers built with a light metal frame in a plastic case are perfectly adequate. Trying to do heavy work on a regular schedule using this type of printer, will cause a break down. Neither the motors, print head nor electronics are designed to run hour after hour on a daily basis.

The measurement of printer work-load is called "duty cycle" and is expressed in percentage of time the printer can continuously operate. The heavy duty printers are said to have 100% duty cycle. Some 100% duty cycle printers were designed for long print runs and constant use. Though costing three times as much as light duty printers they deliver the work. When you read the specifications of a light weight printer and a heavy weight printer, both seem to be equal, but obvious differences in the construction account for the different duty cycle of each. I have noticed several medium priced printers lately claiming to have "100% duty cycle." Before accepting these claims, I would ask for information on how they were tested.

Do not confuse the duty cycle with the quality of the printer. Many printers with duty cycles rated at 50%-75% are just as well made as heavier models and will last just as long if operated properly and not overworked. No advantage is gained in paying for a heavy duty printer if you do not need one.

TABLE 1

PRINT SPEED RANGE
FOR VARIOUS PRINTERS

Type of Printer	Print Speed Range
Low Cost Dot Matrix	60 - 100 CPS
Med Cost Dot Matrix	80 - 180 CPS
Commercial Dot Matrix	150 - 400 CPS
Dot Matrix Line Printers	300 LPM - 600 LMP
Chain Line Printers	300 LPM - 1200 LPM
Thermal Printers	30 - 120 CPS
Thermal Transfer Printers	150 CPS
Inkjet Printers	30 CPS - 150 CPS
Laser Printers	12 pages per min. - 200 pages min.

Paper Feed And Adjustment

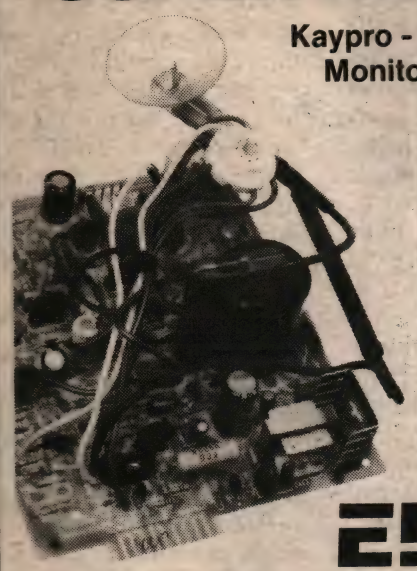
There are three methods of feeding paper into a computer printer: friction feed, tractor feed, and pin feed.

Friction feed, using rubber rollers just like a standard typewriter, is mainly used on daisy wheel printers with single sheets of letterhead paper or rolls of paper. In cases where many sheets are to be printed a special mechanism called a "cut sheet feeder" is attached to the printer to feed one sheet of letterhead after another into the rollers. Non-impact thermal or electrochemical printers often use

continued on page 166

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Buy a Printer
continued from page 165

friction feed because the special paper used comes in rolls that are mounted inside the printer.

Tractor feed has adjustable sprockets which fit into holes on the edge of the paper. When the sprockets are rotated the paper is pulled or pushed through the printer. The sprockets can be moved to adjust to various widths of paper. The paper used is the "endless," fan-folded computer printer paper with sprocket holes on the edge. The paper may be perforated on the side so upon the removal of the sprocket margins, the paper serves as standard sized letter paper. The sprocket margin paper also serves as a carrier for labels that are removed from the backing for use.

Many daisy wheel printers come equipped only with friction feed, but have an optional paper tractor or cut sheet feeder available at extra cost. These attachments are mounted on the printer when needed. Most heavy duty line printers and serial printers use tractor feed mechanisms and special feed trays for the fan-folded paper. The most expensive have dual tractors that both pull and push the paper through the printer.

Many businesses have objected to the perforated look that detached fan-folded letterheads have had in the past. Today the stationary industry has provided letterhead that tears clean and looks like cut sheets of paper. While this costs more, it is finding wide acceptance in business.

In loading paper into most computer printers equipped with paper tractors, the tractor mechanism located at the top of the feed path requires the wasting of at least one sheet every time the printer is loaded or a new document is printed. If additionally, the tractor is located at a distance from the print head area even more sheets might be lost. This extra expense is one few people calculate into the cost of the job and yet it might be significant.

Some of the lower cost printers are made to only take one size of paper, either on rolls or fan-folded. In order to simplify the printer and lower the cost, the third type of paper feed mechanism, pin feed was invented. Pin feed uses non-adjustable pins on a feed roller. In some cases this system is also equipped with an extra roller so that 8 1/2-inch sheets may be used in a friction feed while 9-inch perforated paper is fed through the pin-feed at the end of the rollers. While the pin feed serves to align the paper, it is hard to use and not a satisfactory substitute for paper tractor.

I much prefer tractor feed to any other method of paper feed. It assures paper alignment and uniform feeding. The main drawback is the wasted sheets needed to start the paper into the tractors. Friction feed with or without a cut sheet feeder, is fine for a daisy wheel printer used with single sheets of paper. The cut sheet feeders are expensive but if you must print many letters on preprinted letterhead they are a necessity.

In my opinion, pin feed is to be avoided at all costs. Not only are you limited to one width of paper, loading is extremely difficult and much paper and time is wasted in the effort. If the printer you select comes with pin feed and tractor feed is an extra cost option, do not buy the printer without the tractor feed option.

Paper Thickness Adjustments

Paper thickness adjustment is an important feature few people realize exists until they need it. In today's world multi-part forms are the rule rather than the exception. Computer reports, invoices, bills of lading for shipping are but a few uses we all are familiar with. In trying to insert 3 or 6 part forms into the printer, you will find some adjustment is required in the paper feed spacing, in the paper tractors, and in the distance between the print head and the platen. The print hammer must also be set to apply the greater force needed to make an impression through several sheets of paper and carbon. Most of the less expensive printers simply do not provide these adjustments.

Monochrome And Color Graphics

An important emerging consideration in the selection of a printer is the printing of monochrome or color text and graphic images. Most of the newer dot matrix printers have the ability to print any graphic image shown on the CRT. Many can also mix graphics and text so illustrations, graphs and charts can be included in business reports.

To produce the mixture of graphics and text a dot matrix printer with graphic capabilities and the proper software is needed. The method of operation can be dot matrix impact, thermal transfer or inkjet spray. The method of printing the dots on the paper is not as important as the number of dots per square inch (known as the resolution) that can be printed. Higher resolution usually raises the cost of an impact printer.

Printer Ribbons And Cartridges

Impact printers and thermal transfer printers use ribbons to make an impression on paper. Inkjet printers use ink cartridges and laser printers use toner cartridges. Obtaining the correct refills can become a problem. Most manufacturers have designed special cartridges to hold the ribbons, printing ink or toner for their printers which will accept only that one type of cartridge. Exclusivity rather than interchangability has been the pattern in the past. Problems arise when newly introduced printers use cartridges not readily available in the stores. In addition the price of the special cartridges is often high creating an unexpected and unplanned expense for the user.

The new color printers have further complicated the ribbon problem. Everyone of the dot matrix color printers uses some kind of a special ribbon often only available at the store where the printers are sold. Being a limited market item the computer stores are often out of stock. In researching this subject I found only one stocked color ribbon and it was only carried by the largest computer supply companies. The printer has been on the market for two years yet the ribbon, costing $18.75, is just starting to appear in the inventory of major computer supply houses.

Other printer manufacturers have designed their machines to use common typewriter ribbons found in any office supply store. The user gains because the savings in ribbon costs over the life of the machine can almost pay for the printer!

The new inkjet printers all use some kind of ink cartridge containing the actual print head. Most contain liquid ink although one uses a dry type ink. With cartridges only stocked at the printer dealers, the availability of a cartridge should be a major consideration in the decision to purchase a printer of this type.

The Laser/xerographic printers that use the Canon copier "engine" (as the copying mechanism is called) use a

continued on page 167

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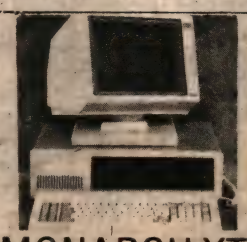
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Buy a Printer continued from page 166

replacable cartridge containing both the toner and the print drum. These cartridges may be available from Canon dealers as well as printer dealers so there should be no difficulty getting them. However, the printer cartridges are different from the copier cartridges and cost more. The cost for a cartridge with black toner is $65. A cartridge with colored toner costs $95. If you wish to print color the cartridge must be changed every time the color changes. Needing at least one cartridge and one spare on hand for each color you want to print means a rather large investment in cartridges for your laser printer. Consider this in the overall cost of the printer.

Where Is The Printer Going To Be Located?

The effective distance for use of parallel interfaces is very short (10 to 20 feet from the computer). If you plan on using a printer with a Centronics type parallel interface, you must keep computer and printer as close as possible. Even with the use of shielded cables, any parallel interface runs into trouble distanced more than 10 feet from the computer. Not only does the cable pick up interface from the electrical noise in the environment, but the cable with its large number of wires generates it own "cross-talk" interference.

To operate the printer at a distance up to 50-feet from the computer you can use RS-232C serial transmission over 50-feet of direct connect cable. Even with an RS-232C interface you may find there is interference. Several solutions are available for this problem. One is to use special amplification circuits, called drivers and receivers, at each end of the long cable. Another solution uses an order method of interface formerly used in teletype transmission called 20Ma Current Loop. This method of transmission uses higher voltages and current than RS-232C. (The technical details are beyond the scope of this article.) Technical communications experts still use it to extend the range of serial interface as far as 200-feet.

The more modern method of long-distance serial interfacing is accomplished with the use a device designed to allow computers to talk over the telephone. This device, called a Short Haul Modem will allow you to transmit data over a private telephone line for distances of several miles. The costs of connecting your peripherals to the computer must be considered in the overall purchase price.

Printer Noise. The noise generated by a printer must be a consideration in your selection. Like typewriters, impact computer printers make a great deal of noise. The bigger and faster the printer, the greater the noise. The best way to judge the sound level of a printer is to listen to it in the same environment as the proposed installation, preferably in your office or home. Printer noise is conducted by the paper. No matter how well the printer case is padded the sound escapes from the paper feed openings. In an effort to reduce noise many manufacturers build printers into sound absorbing cabinets. Soundproof housings are also available for your printer but most housings are inconvenient and bulky. My suggestion is to buy the printer you need but situate it so the fewest people will be disturbed.

How Many Computers Are Going To Be Served By The Printer?

With the development of groupings of computers in an office, known as Local Area Networks (LANs), multi-user computer systems with one printer serving several computers now is possible. With increased service a faster printer than one devoted to one computer is needed. A heavier duty cycle is also needed since printing jobs from one computer after another will occur. With the printer filling many different jobs various type fonts will be needed.

When a printer serves many users, a large print buffer either connected internally or externally becomes a necessity in order to free a computer during the printing operation. In larger installations, one computer on a network, designated as the print server, must be set up to operate a large file called the print spooler. A computer needing to print can then dump the print file into the spooler and go about its business. The print server computer operates the printer feeding one print file after another until the spool file is empty. Although print buffers cost money, their use makes the printer much more efficient.

Does Your Printer Need Special Options?

When planning our printer requirements reading all the specifications for the higher priced models complete with the special options available is the only way you will find that they exist and what they can do for you. The printer salesman selling low cost printers in a computer store is never going to tell you what you are missing!

* Horizontal Tabs and Vertical Tabs--If you are a typist you know how much time can be saved by setting horizontal tabs. In many word processing program tabs, stored in a format file and sent to the printer during printing, can't operate if the tabbing option isn't in the printer to start with.

Vertical Tabs are even more useful if you are printing information onto preprinted forms. These tabs space down the form to the correct lines permitting the easy insertion of information into blanks on the form. The vertical tabs must set in software for each form.

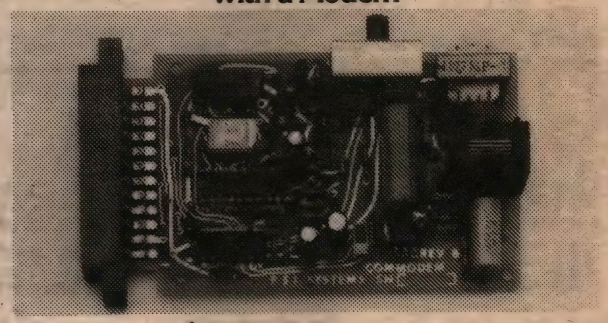
* Print Buffers--When using a computer printer the computer must direct the operation and send data on a line-by-line basis. This is a ridiculous situation when you think about it!

continued on page 168

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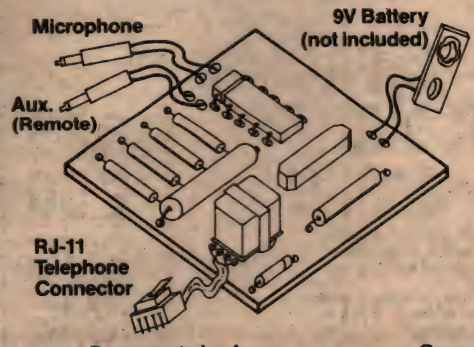
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Table 2

Printer Selection Table

Service	Type Speed	Printer Type
Program Listing	80-100 cps	Non-impact thermal printer.
Hobbyist or small business.	80-120 cps	Low cost dot matrix printer.
Word Processing	12-55 cps	Daisy Wheel or solid type element. Inkjet Spray printer.
Medium Business Use	180-300 cps	Heavy duty serial, dot matrix printer. Small Laser Printers (Cannon, H.P.).
Heavy Business Use	300-600 lpm	Line Printers Laser Printers
Service Bureau Use	300-1,500 lpm	Line Printers Laser Printer
Special Use: Graphics	60-120 cps	Color Dot Matrix Printers, Color Ink Spray Printers.

Questions And Answers To Help You Select Your Printer

1. How much of your computer printout consists of business correspondence?

75 to 100%_____; 50 to 75%_____;
25 to 50%_____; Less than 25%_____.

2. How much of your computer printout consists of spreadsheets or financial reports?

75 to 100%_____; 50 to 75%_____;
25 to 50%_____; Less than 25%_____.

3. How much of your printout consists of labels?

75 to 100%_____; 50 to 75%_____;
25 to 50%_____; Less than 25%_____.

4. How much of your printout is 11 by 14 sheets?

75 to 100%_____; 50 to 75%_____;
25 to 50%_____; Less than 25%_____.

5. How much of your printout is 8 1/2 by 11 sheets?

75 to 100%_____; 50 to 75%_____;
25 to 50%_____; Less than 25%_____.

6. How many total pages do you print in a day?

Over 1,000_____; 500 to 1,000_____;
100 to 500_____; Less than 100_____.

7. How often do you intend to use a computer printer?

Every day_____; Every other day_____;
Twice a week_____; Once a week_____.

8. Do you need to print graphics, charts, graphs?

Yes_____; No_____; Don't know_____.

9. Do you intend to print color?

Yes_____; No_____; Don't know_____.

10. Will your printout be used as draft or reproduction copy?

Draft copy_____; Reproduction copy_____.

11. How many computers will your printer serve?

Several _____ ; Two _____ ; One _____ .

12. What kind of paper will you use for your printer?

Roll paper_____; Fan fold, multi-sheet_____;
Fan fold, single sheet; Single sheets; Letterheads;
Letterheads on carriers_____; Envelopes_____;
Envelopes on carriers; Labels; Labels on carriers;
Pre-printed forms_____.

Table continued on page 169

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DON'T DELAY.

Buy a Printer
continued from page 167

Here you have a 2 million cycle-per-second computer slowed down to run a 15 CPS printer, unable to do anything else while directing the printing! To solve this dilemma, some printers offer print buffers, banks of RAM memory into which you can dump an entire document, thus freeing your computer for other work while the printer prints.

Does The Printer Require Special Software?

When you read all about printer features such as various type fonts, graphic capabilities, proportional spacing, underlining, or horizontal and vertical tabs, you must realize there are limits imposed by the software you are using or are going to use. In all printers special features are invoked through the use of special "Escape Codes." With no "standard" Escape Code established for all printers, each printer manual lists those Escape Codes effective for that printer. These Escape Codes must be programmed into the data being sent from the computer to printer. With the correct Escape Codes you can write programs utilizing all of the special features built into the printer.

When you use a commercial software package such as a word processor, spreadsheet or acounting package and have not done the programming, there is no way to get into the program to implement your printer's features unless the author of the software has made provisions for you to do so. When provision is made the software package has a program called "INSTALL" which allows you to specify the printer you are using. The printing routine within the software package will then be automatically modified to implement some (but not all) of your printer's features.

If you are going to be using packaged software with your computer, do not pay extra for a printer with features you will never be able to use. Coordinating the two purchases so you get the most from both requires many questions directed to both the software vendor and the printer seller.

Buying More Than One Printer

After you have analyzed your printer requirements you may find the bulk of your work calls for one type of printer, possibly a daisy wheel letter quality machine (users still demand daisy wheel printers for correspondence). Yet there may be many occasions when

Continued on page 169

Buy a Printer
continued from page 168

graphics are neeed. Since daisy wheel printers cannot print graphics, the solution would seem to point to buying a dot matrix printr with near letter quality capability. If you have such varied requirements, I suggest you buy more than one printer.

Prices have come down in recent times and you can buy a good quality, slow speed, daisy wheel printer for between $500 and $800. You can also buy a 132-column dot matrix printer with graphic capabilities for $700 to $1000. I suggest the more versatile 132-column dot matrix printer for use in general office work and with electronic spreadsheets instead of the narrower 80-column printer.

If you do decide to purchase two printers for use with one computer, how do you connect them? There are several ways to make the connection. First, you can install two parallel I/O boards addressed at different ports, a complicated solution requiring software patches. Second, you can buy one serial printer and one parallel printer and switch them with your operating system. Third, you can buy a switch box allowing computer connection with either printer at the turn of a knob. The fourth and simplest method is having one cable you switch by hand to the printer you wish to use.

Buying Used Printers

Buying used printers is one way of saving a lot of money. Be aware though you are purchasing the life remaining in the machine. Most leasing companies only lease new equipment so when computers or peripherals are returned after a long-term lease they are all sold. Companies who own their equipment often sell it after all allowable depreciation under the tax laws has been taken. Most of the peripherals sold by these companies are two to five years old. Printers made by well known manufacturers often have several operation years left. Therefore buy only the heavy duty, quality printers made by established companies who will still service them.

Both the condition of the printer and the interface must be checked before you buy. Most of the printers used with minicomputer systems were Original Equipment Manufacturer models (OEM models). OEM means the printer was made to the minicomputer manufacturer's specifications and often a non-standard interface unique to that sysem, was used. Though the printer might have been made by Centronics, there is no guarantee a "standard" Centronics interface was used. Even the use of an RS-232C interface does not guarantee interfacing because non-standard cabling might have been used. Some of those early printers used some very strange connectors.

There are now a lot of used Diablo Hi Type I daisy wheel printers on the market at what seems to be very low prices. Be warned that these are very old machines with most of their life used up. The power sup-

Q & A continued from page 168

continued on page 170

13. Where will the printer be located?

In the office, near the computer_____.
In the office, away from the computer_____.
In a remote location_____.
In a library or hospital_____.
In your home_____.
In a computer room_____.

14. How much have you budgeted for a printer?

Over $5,000_____; $3,000 to $5,000_____;
$2,000 to $3,000_____; $1,000 to $2,000_____;
$700 to $1,000_____; $500 to $700_____;
$300 to $500_____; $200 to $300_____.

Answer Analysis continued on page 170

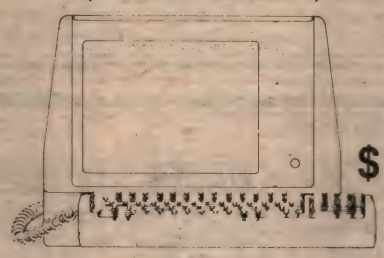
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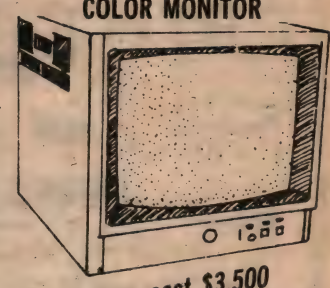
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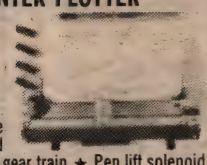
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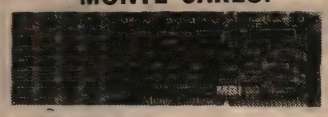
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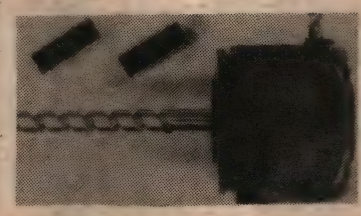
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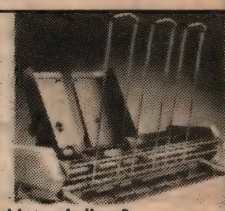
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Buy a Printer
continued from page 169

plies and electronics are old and of a previous generation design. You may not be able to have them fixed when they break down. They are no bargain at any price!

Another suspect bargain offered by surplus dealers are Qume printers of fairly modern design. The problem with these is that they were OEM machines designed to be used exclusively with word processing systems. Not having any type of standard interface, they often use non-standard codes. Unless rebuilt by someone very knowledgeable in printer electronics, they are worthless for use with a personal computer.

There are several reliable companies who buy older machines, rebuild the worn mechanical parts and convert them into standard interface printers using modern technology. (Some advertise in *Computer Shopper*.) The rebuilt machines often cost more than some of the slower, lightweight imports. They are worth it! The *quality* rebuilt product is reliable and carries a guarantee.

If you are considering buying a used printer from an individual, try to arrange to use it with your computer before closing the deal. Remember to check on the availability of such major replacement parts as print heads and feed rollers. Add the price of a new print head when you are calculating the actual price of the used printer. If you decide to purchase, discuss a trial period, return privileges, and reasonable charges if necessary. Asking questions first usually saves you much trouble later on.

In any event when considering used printers, be aware of all the considerations mentioned in this article and be careful. Having your printer break down just when you need it is bad. Having that happen and not being able to get repair parts is worse.

Answer Analysis

Question #1: If 50 to 100% of your printout is business correspondence you need a letter quality printer. 25 to 50% indicates that a dot matrix printer with near letter quality printing will serve your needs. Less than 25% also calls for a NLQ dot matrix printer.

Question #2: A high percentage answer indicates a need for a wide (132 column) carriage printer.

Question #3: A high percentage answer calls for a good quality dot matrix printer. Any answer calls for tractor feed. A high percentage answer also calls for a vertical tab feature.

Question #4: Any answer calls for a wide carriage 132 column printer. Tractor feed preferred.

Question #5: 75 to 100% will allow you to buy an 8 1/2 by 11 printer. Less percentage indicates you must have at least one 132 column printer available in the office.

Question #6: Over 1,000 and you should consider a line printer or heavy duty serial printer. 500 to 1,000 consider a heavy duty serial printer. 100 to 500 indicates a medium duty serial printer. Less than 100, a light duty serial printer would fill the need.

Question #7: Combine the answer to this question with the answer to #6. High and frequent usage calls for a heavy duty printer. A medium duty printer can print high volume occasionally.

Question #8: Graphics use requires dot matrix. It may be an impact, non-impact or ink jet printer.

Question #9: A yes answer requires a printer equipped for color reproduction. Don't know may indicate a printer with provisions for adding color at a later date.

Question #10: Draft indicates a dot matrix printer. Reproduction copy indicates daisy wheel, thimble, or laser printer. Graphic reproduction may use ink jet.

Question #11: The several answer indicates heavy duty, dot matrix, laser printer or line printer. The two answer indicates heavy duty printer with switch box or network. The one answer leaves you the choice of entire field.

Question #12: Friction feed is best used with Roll, single sheet, letterhead, envelopes and preprinted forms.

Tractor feed is best used with fan fold, multi-sheet, fan fold single-sheet, labels, letterhead or envelopes on carriers.

Cut sheet feeder is best used with letterheads, single sheets and envelopes.

Question #13: Office, near computer--You can use a parallel interface; Noise from printer might require a purchase of a sound proof cabinet.

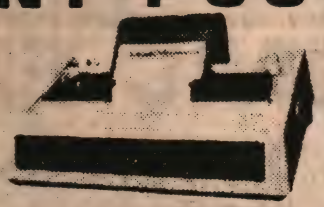
Office, remote from computer--requires RS-232C serial interface or short haul modem. Consider noise of printer when situated in projected area.

Remote location--you may need modem interface or RS-232C serial interface.

Library, hospital--non impact printer or sound supres-

continued on page 171

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HR 25 480
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Data General/One Prices Lowered

Data General Corporation recently announced that it has lowered prices by $800 to $1500, on all three models of the Data General/One portable personal computer, a decrease of between 23 and 32%.

The new prices for the three Data General/One configurations are: $2195 for a 256KB, 1 drive system which was formerly $2995, $2695 for a 256KB, 2 drive system which was formerly $3495 and $3195 for a 512KB, 2 drive system which was formerly $4695.

In addition, the price of add-on memory has been reduced by 58%. Incremental memory of 128KB has been lowered to $250 from $600, and 256KB memory has been lowered to $495 from $1200.

According to Cliff Bream, vice president and general manager of Data General's Desktop Division, "The price reductions announced recently are in line with our overall corporate objective: to offer a full functional portable pc at an aggressive price, thus maintaining our established price/performance leadership."

Bream added, "This price reduction will not only give the Data General/One a strong competitive price advantage relative to other portables in its category, but will also position the Data General/One as a viable alternative to a desktop PC. It is now possible for customers to recognize the benefits of portability without paying a significant premium for that advantage."

"Data General has taken an active role in monitoring and addressing customer feedback as we have received it," explains Alan Oppenheimer, director of dealer marketing, Desktop Division. "This is particularly true relative to screen readability and pricing. Our strength as a billion dollar company has allowed us to respond quickly with a dramatically improved tilt screen LCD, the introduction of the monitor-printer-diskette-adapter, (a peripheral which allows hook-up to a black and white or color monitor), and significant price reductions. All this has been accomplished in less than one year since the product's introduction."

For further information contact Data General, 4400 Computer Drive, Westboro, MA 01580, (617) 366-8911.

Mention that you read about it in the *Computer Shopper*. ●

Buy a Printer
continued from page 170

sion cabinet required.

Home--noise may be a factor, avoid line printers.

In a computer room--best place for high speed printers. Line printers do best in this environment.

Question #14: Over $5,000 buys you a laser printer or a high speed line printer for a whole network.

$3,000 to $5,000 pays for a heavy duty, high speed dot matrix with all the "bells and whistles" or a fast daisy wheel with a cut sheet feeder.

$2,000 to $3,000 is a medium price range for 132 column, heavy duty dot matrix or most high speed (55cps) dot matrix printers. Good ink jet printers are also in this range.

$1,000 to $2,000 is the range for most 132 column printers. Good dot matrix, daisy wheel and ink jet printers are available.

$700 to $1,000 is the range for medium duty 80-column dot matrix printers, both monochrome and color with graphic capabilities lie in this range. Slow daisy wheels of good quality and some ink jet printers and thermal transfer printers also are found in this range.

$300 to $500 is the range for light duty dot matrix with graphics and slow lightweight daisy wheels.

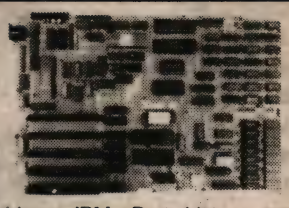
$200 to $300 is the range where you will find only "bargain printers," standard brands only on sale. This is the lowest price range for a printer. ●

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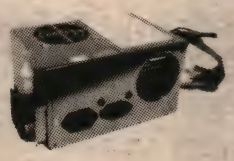
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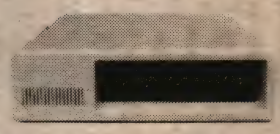
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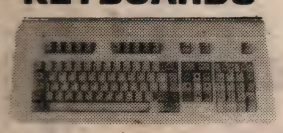
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Ask The Guru

by Don Lancaster

We'll start out with our usual reminder that this is your column, and you can pick up technical help by using the phone number shown below. Your best calling times are 8 AM to 5 PM — *Mountain Standard Time.*

Apple has apparently just dropped their bargain *ProDOS Applewriter* $50 upgrade offer for owners of any older versions of Applewriter. They must have reasoned that a year was long enough. I feel that this move was extremely stupid, and that the upgrade availability should go on for a minimum of at least one more year. One reason for this is that people are just beginning to discover the remarkable hidden powers lurking within Applewriter. The beauty of the WPL/Postscript linking is one newly discovered use.

Apple's steadfast refusal to sell any replacement manuals is equally shortsighted.

If you agree, then rattle *Apple's* cage. Or at least run a stick over the bars.

We have a winner in our latest contest. Mark Bannister of Huntsville, Alabama wins a free book as well as an all expense paid tinaja quest for two (FOB Thatcher, AZ.) for his winning entry in our great Applewriter contest. As you may recall, all you had to do to enter was show the best way you could milk cows while using Applewriter.

To quote Mark "it is common knowledge that the whirring sound of the Apple II disk drives cause milk cows to lactate on their own. Just put a bucket under the old gals and set your disks to spinning. My neighbor informs me that it works on goats as well."

Since we only had a few entries so far, I'll "open up" the contest a bit more and award some more book prizes. To win, just show me the most off the wall or the most creative or the most oddmented current use of Applewriter.

Our previous contest, of course, has no winners to date. All you have to do was show me any way at all to get graphics out of a Macintosh that was even remotely as good as the *Laserwriter* graphics you can get out of an Apple IIe.

Yes, we have had bunches of entries. Nobody has even come close, although quite a few IIes have been newly bought.

To get started on the contest, just write or call for a copy of my free *Laserwriter Demo Pack*. Then try - just try - and do any of the mixed text and graphic images on a Mac.

What Is The Word On The Apple IIc Monitor Upgrade?

There is now a new and double sized monitor ROM available for the IIc. It is called the IIc 3.5 ROM and has quite a few new features.

This new chip has the firmware *protocol converter* required by the new 3.5 inch disk drives. In fact, you *must* upgrade to this new monitor if you are going to add these new smaller drives to your system.

The new monitor also has a complete *AppleTalk* driver, which now lets you connect your IIc onto the AppleTalk bus.

More importantly, the new monitor includes a 65C02 mini-assembler, along with trace and debug features. Not nearly as good as *Bugbyter*, of course, but still most handy. And, being RAM resident, no extra space is needed while assembling or debugging.

The new monitor also adds many of the Super Serial Card commands that were left out of the original IIc monitor. This means you can now run the *Laserwriter* off a IIc almost as easily and conveniently as you can off a IIe.

The 3.5 ROM is now a 32K device, arranged as two banks of 16K words. Each word is eight bits long. Bank switching is done by use of machine language location $C028 in what used to be the cassette recorder output portion of the address space. On reset, the "main" 3.5 bank is first selected. Each successive addressing of $C028 will toggle, first going to the "auxiliary" bank, and then back to the "main" monitor bank.

To install the new ROM, a change in the motherboard *must* be made, cutting one line, and jumpering the unused cassette line over to the additional address pin on the 3.5 ROM.

I have heard of two different ways the upgrade is being made. Developers can buy a kit and do the cutting and jumpering themselves. This kit may be available at a dealer, but it is equally likely that they will want to swap out the entire IIc motherboard instead.

There would be two big advantages to Apple for a motherboard swap. Many earlier IIcs had a problem on the 1200 baud modem. Apple tried to use a baud rate that was "pretty nigh but not plumb." A new crystal and two trace cuts solved this problem, and current IIc boards include this fix. A motherboard swap would pick up any older IIcs that still do not have this defect corrected.

Another reason for doing a board swap is the reliability involved in jumpering and cutting, which could lead to repair and warranty hassles.

A fourth i.d. byte is now needed to tell the old and new IIc monitors apart. Location $FBBF is an $FF in the original IIc ROM. $FBBF is a $00 in the new 3.5 IIc ROM.

At any rate, there is a new free manual titled *Apple IIc Programmer's Guide to the 3.5 ROM*. It is publication number *A2L4037*. It should be available directly from Apple. A complete monitor listing is included in this manual.

As far as my products are concerned, this new ROM will now let you run all of my *Applewriter/Laserwriter* utilities on a IIc as easily as you can on a IIe. I also have an improved absolute reset patch for the IIc that can be used with either the older or newer IIc ROM. Write or call if you need information on any of this.

Tell Me All About The ProDOS Applewriter 2.1 Update

The original release of ProDOS Applewriter 2.0 had a very serious bug in it. This bug affected many users of so-called "intelligent" IIe parallel printer cards, including the *Grappler* and the *Pkaso*. The usual symptoms included bizarre printing, such as burst of 23 spaces every 237 characters, or else the complete ignoring of imbedded printer codes.

Part of the fault lies in older versions of the ProDOS

Continued on page 178

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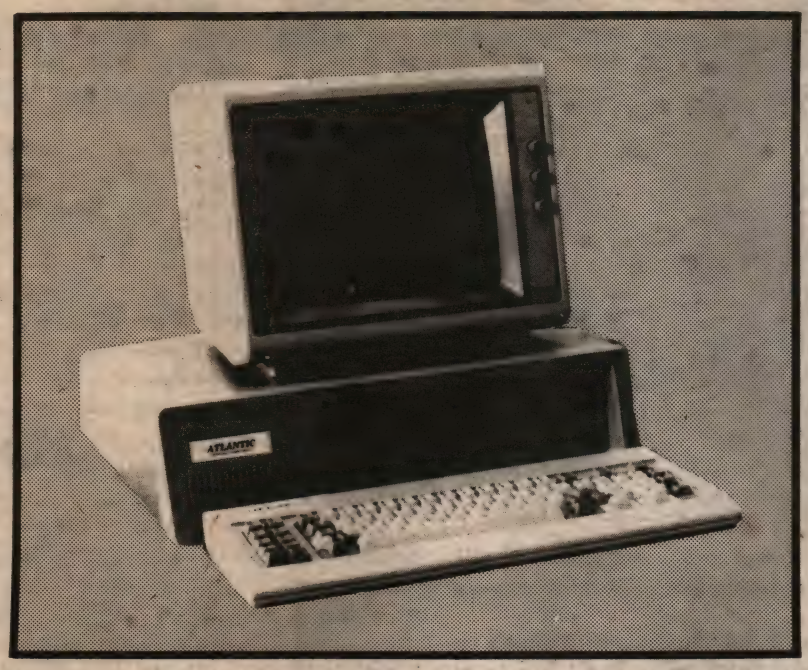
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New Tandy 600 Laptop Computer

The Tandy 600 laptop computer was introduced recently at approximately 1100 Radio Shack Computer Centers, Plus Computer Centers and participating dealers and franchises nationwide. The newest laptop from Tandy, the leader in portable computers, is an upward extension of the popular Tandy 100/200 laptop computer family.

"Laptop users asked for more contiguous memory, an 80-column display, built-in disk storage, and enhanced word processing, spreadsheet and telecommunications facilities. When we brought out the Tandy 200, the cost of technology needed to offer those features was simply too high. Now, the costs and technology have reached the point where we're able to offer greatly enhanced features while maintaining the basic characteristics that made the Tandy 100 and 200 portable computers the laptop industy leaders," explained Bernard Apple, President of Radio Shack.



The Tandy 600 laptop computer uses the 16-bit 80C88 microprocessor, and comes with 32K RAM storage. The memory is expandable to 224K, in one contiguous memory bank. The built-in 3.5" floppy disk drive has a capacity of 360K, and the adjustable, flip-up 80 character x 16 line LCD display has a matte finish to reduce glare. The computer weighs 11 pounds, including the AC power adapter/recharger. It measures 2 3/4" (h) by 13" (w) by 18" (1).

The Tandy 600 portable computer features Microsoft Works, five very powerful, full-featured built-in applications, which are written to use key words displayed at the bottom of each screen. Application programs built into ROM on the Tandy 600 laptop comuter include file management, database, word processing, spreadsheet, calendar, and telecommunications software. Built-in nicad batteries, which last approximately 11 hours between charges, are easily recharged with an AC adapter, which is included with the Tandy 600 laptop computer.

Suggested retail price for the Tandy 600 portable computer (Cat. No. 26-3901) is $1,599.

Tandy 600 Portable Computer Specifications

Hardware

* The Tandy 600 portable computer contains the features Tandy 200 and Model 100 portable computer users wanted most.
* 32K RAM available for file storage. Memory expandable to 128K or 224K with 96K memory upgrade kit, priced at $399.95.
* Built-in 3.5" floppy disk drive, with a capacity of 360K.
* Flip-up 80 character x 16 line LCD display with matte finish to reduce glare. Screen adjustable for most lighting situations.
* Internal 300-baud direct connect modem, with auto answer/auto dial.
* Weighs 11 pounds, including AC power adapter/recharger.
* Measures 2 3/4" (h) by 13" (w) by 18" (1).
* Low-power, 16-bit 80C88 microprocessor.
* The Tandy 600 protable computer includes:
  --Standard RS232C connector.
  --Expansion bus for external floppy disk drive.
  --Parallel printer port.
  --Full feature typewriter keyboard.
  --Built-in nicad batteries and AC adapter charger.
  --Battey life is approximately 11 hours.
* Allows the use of custom applications via optional ROM slot (by removing MultiPlan) using standard 27256 EPROMS.
* A built-in clock includes many features not found in other portables, including auto-wakeup, which turns the unit on to answer a phone call or run an application program.
* Automatic shutdown, or sleep function, helps conserve battery life by turning the unit off after a specific length of time.
* Optional ROM for BASIC.

Applications

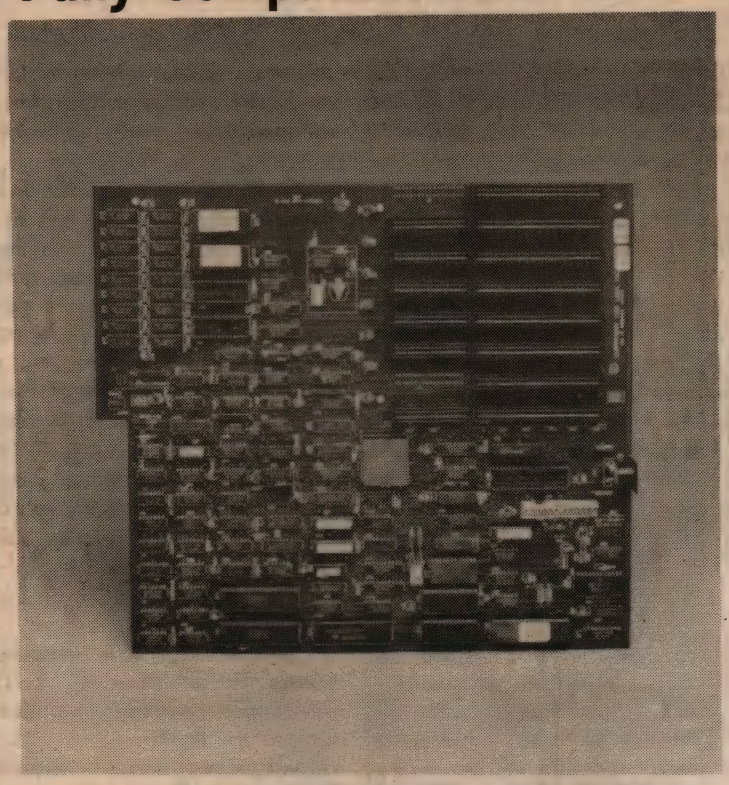
* The Tandy 600 portable computer includes five full-featured built-in applications, which are written to use key words displayed at the bottom of each screen.
* SYSTEM MANAGER allows the user to run each application, exchange information between applications, and manages the files created. Information created by Multiplan can be moved into Word, etc. The System Manager handles file management for the disks drive and RAM. Date and Time are displayed on the screen.
* WORD allows the user to produce letters, memos, and reports for office, school and personal use. Word contains all the normal word processing features including right justification, global search and re-

continued on page 176

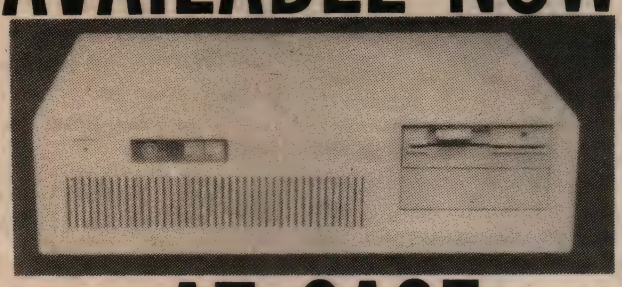
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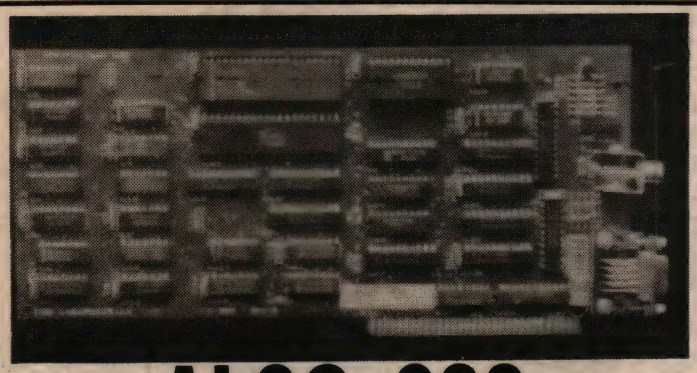
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Tandy 3000 Personal Computer

Tandy Corporation unveiled the Tandy 3000 personal computer at its annual shareholders meeting November 14th. "The Tandy 3000 computer offers more expansion capability, increased speed, and smaller physical size than the IBM PC/AT, with which it is fully compatible," stated Tandy's chairman, CEO and president John V. Roach. "Priced at only $2,599 for a floppy disk system or $3,599 with a 20 megabyte hard disk, it represents the best value yet in the high-power IBM-compatible arena, and it's available now in our Radio Shack Computer Centers and participating dealers nationwide."

"Tandy's major corporate accounts have been especially anxious to have this computer available," said Ron G. Stegall, senior vice president of the company's Business Products Division. "It's a Tandy-designed, Tandy-built computer, and we designed it for AT-compatibility, and to lead the market in price/performance and capability."

The Tandy 3000 computer will be sold in two configurations. Both include one-half megabyte of main memory (512K RAM), expandable to 640K on the main board, and both will support up to 11 megabytes. There is room for three, 5 1/4" disk drives... either one floppy drive and two hard drives, or two floppies and one hard drive. The $2,599 unit includes a single 1.2 megabyte floppy disk drive. At $3,599, the Tandy 3000 HD computer contains a 1.2 megabyte floppy drive and a 20 megabyte hard drive. Optional internal drives will include 1.2 megabyte, or 360K floppies or a 20 megabyte hard drive.

Owners can choose either of two operating systems. The MS-DOS 3.1, operating system will be available at introduction, and includes support for Tandy's ViaNet local area network. In the second quarter of 1986, the XENIX 5.0 operating system will allow two to six simultaneous users on the system.

The computer uses the Intel 80286 microprocessor, operating at 8-megahertz, 33.3% faster than the PC/AT. The Tandy 3000 Deluxe Graphics Adapter displays the standard IBM CGA modes as well as additional modes, including 640 x 400 two-color and 640 x 200 16-color, using Tandy's outstanding non-interlaced, flicker-free monitors.

Standard features include a real time clock with battery backup, a serial/parallel adapter, PC/AT-compatible keyboard, and a provision for an optional plug-in 80287 math co-processor.

A full range of options will be supported through ten expansion card slots, eight of which are open in the standard computer.

Tandy's most powerful personal computer measures 6.5 x 19.0 x 18.0 inches. It rounds out one of the most complete MS-DOS computers in the marketplace, including the Tandy 1000, 1200 and 2000 computers, all of which are available in both floppy and hard-drive versions.

Tandy business computers are serviced and supported by more than 60 dedicated Business Products Service Centers nationwide...the largest support network offered by any personal computer manufacturer. Available are carry-in and on-site service contracts, walk-in service, "hot line" and on-site consultation service, installation and orientation for new users, and user training.

Tandy 3000 Personal Computer Specifications

The Product

* Uses 16-bit 80286 microprocessor chip that operates at 8-megahertz, 33 1/3 percent faster than the IBM PC AT.
* Fully compatible with IBM PC AT expansion and software products.
* Standard configuration offers 512K memory and 1.2 megabyte floppy disk, and an optional internal 20 megabyte hard disk.
* Excellent for serious business, professional, engineering, data processing applications.
* Supports both MS-DOS 3.1 and soon-to-be-released XENIX 5.0 operating systems.
* Can be used with ViaNet local area network to link with other MS-DOS operating system computers.
* Two to six users can work simultaneously on one Tandy 3000 with the XENIX operating system.
* Tandy 3000 Personal Computer (cat. no. 25-4001) priced at $2,599; Tandy 3000 HD (cat. no. 25-4010) priced at $3,599.
* Available at Radio Shack Computer Centers and Radio Shack Plus Computer Centers and dealers nationwide.

The Hardware

* Standard high capacity 5 1/4" slim line floppy disk drive

continued on page 178

Tandy 600 Laptop

continued from page 174

place, automatic page numbering, multiple format lines, and many others.

* CALENDAR keeps track of daily appointments, tasks and activities. A built-in alarm can be set to remind you of appointments even when the Tandy 600 portable computer is running an application. An alarm will sound, and the screen will display the appointment or message.
* FILE can be used as a simple or complex data base for maintaining addresses, expenses, client billing or inventory.
* TELCOM includes auto dial, answer, wake-up and host modes. It also supports XMODEM protocol for error-free downloading of files. With the auto wake-up function, the Tandy 600 portable computer will turn itself on, call another computer and upload or download data to RAM or disk. Telcom also supports many VT-52 escape sequences for cursor positioning.
* MULTIPLAN is a full-featured spreadsheet and the files can be transferred through Telcom to Multiplan or other applications.

Availability, Price

* On sale at approximately 1100 Radio Shack Computer Centers and Plus Computer Centers nationwide.
* Suggested retail price for the Tandy 600 portable computer is $1,599. ●

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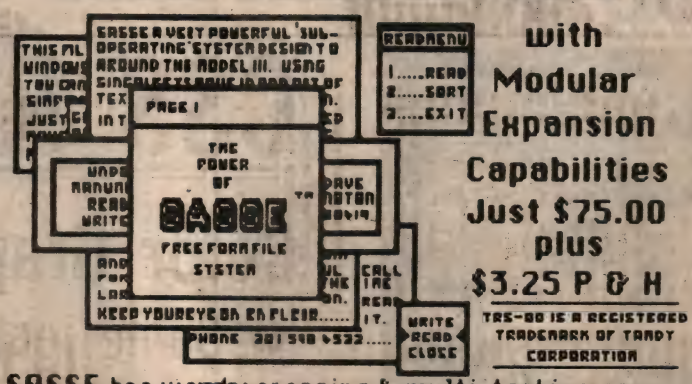
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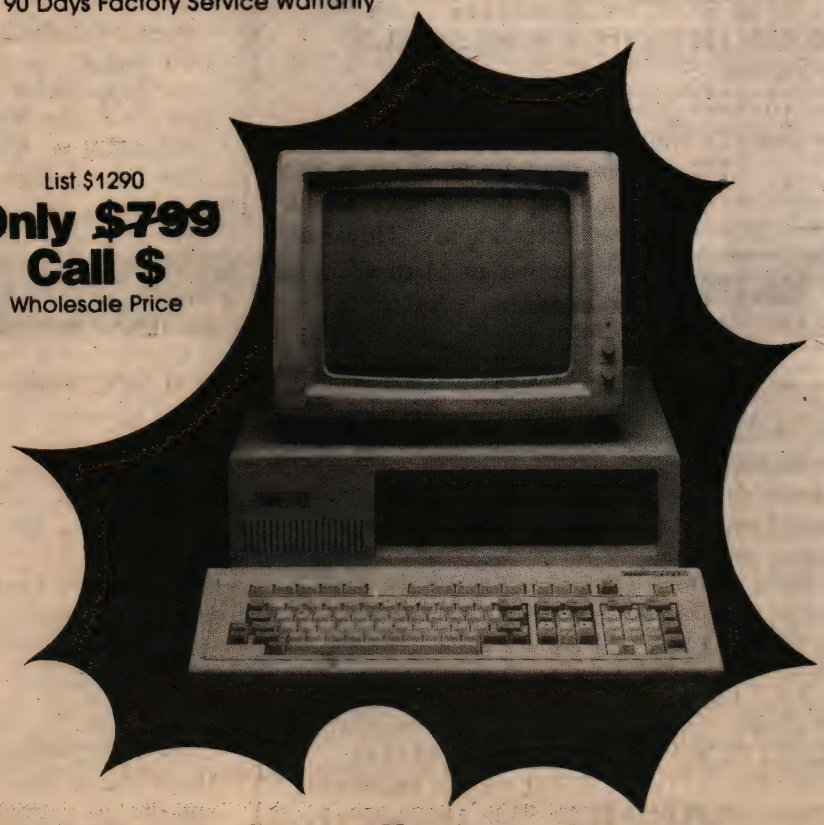


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Tandy 3000
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●

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operating system, while another part is caused by Applewriter 2.0 outputting its characters in low ASCII form (MSB = 0), instead of a high ASCII (MSB = 1) format as is done under DOS 3.3.

The patches to upgrade to ProDOS Applewriter 2.1 are available free from your local Apple dealer. These patches are very minimal. None of the stuff that really needed fixed got done. All that was repaired was a few of the user problems involving non-Apple interface cards.

Figure one sums up the changes to the new 2.1 version of ProDOS Applewriter. There are only a few dozen bytes of code that change; unfortunately they make the program *longer*.

Thus, *any custom patches designed for the 2.0 version will NOT work on the 2.1 version!*

Changes in this upgrade include a later version of the ProDOS operating system; a switch to high ASCII output only while you are actually printing; a change to the actual program modules to type $0C files instead of SYS files; some slight changes to the modem code; and a very minor alteration to the DOS Options menu.

Many of the *Synergetics* patches to ProDOS Applewriter can be modified to run under ProDOS Applewriter 2.1. But they *will not* run as is and *should not* be installed.

A new patch that lets you enter Applewriter without trashing an older textfile is also available. This patch lets you undo the NEW command. It also lets you switch back and forth between Applewriter and many other programs, so that fancy things can be done to your textfiles. These could include sorts or extensive math. This mod also can help with rare system crashes, in that you can reboot everything without trashing any part of the textfile that actually is remaining in auxiliary memory.

Write or call for more info on these 2.1 patches.

1. **ProDOS has been updated to version 1.1.1.**
2. **The length is some thirty bytes longer, with the code now running from $2000 to $6009.**
3. **AWB.SYS, AWC.SYS, and AWD.SYS are now $0C file types, instead of SYS files.**
4. **The modem screen prompts are now carats, instead of brackets.**
5. **Characters are output in high ASCII during printing and in low ASCII on PD0 or PD8.**
6. **The DOS Options menu has been converted to "forced subroutine return" option picking.**
7. **The modem REFQ commands are compared against file values, rather than immediate code values.**

Figure One - Changes made in the upgrade to ProDOS Applewriter 2.1.

Are The Apple Monitor ROM's Copy Protected?

The amazing answer to this question is that, yes, the Apple monitor ROM chips are copy protected! But *only* if you try to copy them with a ridiculously expensive stand alone EPROM programmer.

And therein lies a tale.

I started getting these weird helpline calls a few weeks ago in which they were claiming they were *unable to copy* the Apple monitor ROMs. Naturally, the Apple itself can read its own monitor. My *Snatchmon* program can also read the monitor chips, again with no problems.

What could be happening?

I turns out that all of these people were making the absolute reset mods that I've shown you a few columns back, and all were doing so on expensive, stand-alone EPROM burners. Instead of using my *Snatchmon*, they were simply trying to read the original Monitor chip by plugging it into the burner, hand-patching the absolute reset mod into the burner's memory, and then burning a new 2764 EPROM.

And all they were getting for their effort was fatal read errors.

Why?

Well, because the monitor chips used in an *Apple IIe* are *not* 2764 EPROMs. They are instead 2364 factory programmed ROMs. A 2364 turns into a 2764 *only* when pins 26, 27, and 28 are all *externally* connected to +5 vdc. The Apple IIe motherboard does this jumpering for you, but a big old stand-alone EPROM

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burner will not when it is in its *copy* mode.

The solution? Just use a cheap EPROM burner instead of an expensive one, and the copy protection problems will all magically disappear.

What's The Difference Between A Formfeed, Control-L, [L], FF, CHR$(12) And ASCII $0C?

Nothing whatsoever. These are all *exactly* the same thing.

All of these are different ways you can show ASCII control commands. These commands form the bottom 32 codes in the standard ASCII character code. These control commands are used for such *non-printing* things as carriage returns, escapes, form feeds, line feeds, bells, and so on.

Unfortunately, you will find many different ways of showing ASCII control commands as well as many different ways of accessing them.

Figure two shows us five different ways of naming ASCII control commands and their equivalents.

The *ASCII* column shows us the memonic for each control command. For instance, CR is a carriager turn, FF is a form feed, BEL is a bell, and BS is a backspace. This memonic is a reference for people only, and is not recognizable by most personal computers.

The *hex code* column shows us the same ASCII code in hexadecimal, as would be accessed by a machine language progrm or subroutine. Here CR is an $0D, FF is an $0C, BEL is $07, and BS is a $08. You are likely to see this hex notation when reading files associated with programs that are written in machine language.

The *dec code* column shows us the very same ASCII codes in decimal, as would be needed by Applesloth or another high level language. Here CR is a 13, FF is a 12, BEL is a 7, and BS is an 8.

As decimal use examples, you might print a *CHR$(13); CHR$(4)* during DOS 3.3 disk access. This will output a carriage return followed by the "control-D" DOS access command. Or, you might *POKE 28756, 13* to force a carriage return into a textfile. The 28756 is the address of the particular location in which you want to put the carriage return. This, of course, changes with your application. The 13 here is the actual ASCII code for the carriage return.

The *Apple Keys* column shows how you would enter a certain control code from the Apple keyboard. As an example, a *[L]* means to press the control key, hold the control key down, press shift and L, release shift and L, and then release the control key. This gives you a form feed entered directly into your textfile or whatever.

Some word processors will want you to use a *verbatim* entry mode. For instance, to put a form feed into an *Applewriter* file, press [V] [L] [V]. The first *[V]* says to begin verbatim entry. This means that what follows is to be put directly into the textfile, rather than immediately acted upon. The *[L]* is the form feed that gets placed into your file. The final *[V]* cancels verbatim entry so that any new control characters can actually be used for control purposes, rather than going into a textfile.

Finally, the *Oiginal Use* column shows us what the intended purpose of the control command was when ASCII was first standardized. Most of the original uses still apply today. It would be extremely stupid to redefine a carriage return as anything else. On the other hand, the oddball and obscure commands, such as the group separator or range separator, are easily diverted to special new commands that better suit personal computers or software routines.

Some of the Apple keys are really hidden control keys.

Figure three shows us a few of these. For instance, the [tab] key is really a [I] HT or a

Continued on page 180

ASCII	HEX	DEC	KEY	ORIGINAL USE
NUL	$00	0	[@]	Do nothing or null
SOH	$01	1	[A]	Start of heading
STX	$02	2	[B]	Start of text
ETX	$03	3	[C]	End of text
EOT	$04	4	[D]	End of transmission
ENQ	$05	5	[E]	Enquiry
ACK	$06	6	[F]	Acknowledge
BEL	$07	7	[G]	Bell or alarm
BS	$08	8	[H]	Backspace
HT	$09	9	[I]	Horizontal tab
LF	$0A	10	[J]	Line feed
VT	$0B	11	[K]	Vertical tab
FF	$0C	12	[L]	Formfeed
CR	$0D	13	[M]	Carriage return
SO	$0E	14	[N]	Shift out
SI	$0F	15	[O]	Shift In
DLE	$10	16	[P]	Data link escape
DC1	$11	17	[Q]	Device control #1
DC2	$12	18	[R]	Device control #2
DC3	$13	19	[S]	Device control #3
DC4	$14	20	[T]	Device control #4
NAK	$15	21	[U]	Negative acknowledge
SYN	$16	22	[V]	Synchronous idle
ETB	$17	23	[W]	End block transmit
CAN	$18	24	[X]	Cancel
EM	$19	25	[Y]	End of medium
SUB	$1A	26	[Z]	Substitute
ESC	$1B	27	[{]	Escape
FS	$1C	28	[|]	Form seperator
GS	$1D	29	[}]	Group seperator
RS	$1E	30	[^]	Range seperator
US	$1F	31	[_]	User seperator
DEL	$7F	127	[DELETE]	Delete

Figure Two - Standard ASCII control codes can be shown in many different ways.

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Ask The Guru
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horizontal tab command.

I recently had a big flap with a not-too-bright editor who reasoned that, since there were no carriages on personal computers, there could not possibly be any carriage returns.

Now, stop laughing. This was serious. Heavy even.

Well, even if we ignore the fact that most personal computers are used with impact printers that most assuredly do have carriages, the standard ASCII $0D CR is *defined* as a carriage return. Thus, any time a $0D is placed in a textfile, we most definitely have and are using carriage returns.

In fact the single most often used control command on any personal computer is the carriage return.

It is interesting to note that the original ASCII carriage return did just that. It moved the carriage back to the left of the page *without doing a line feed*. Should you want to go to the next line down, *two* commands were needed, a carriage return to get back to the left side, and a line feed to move down a line.

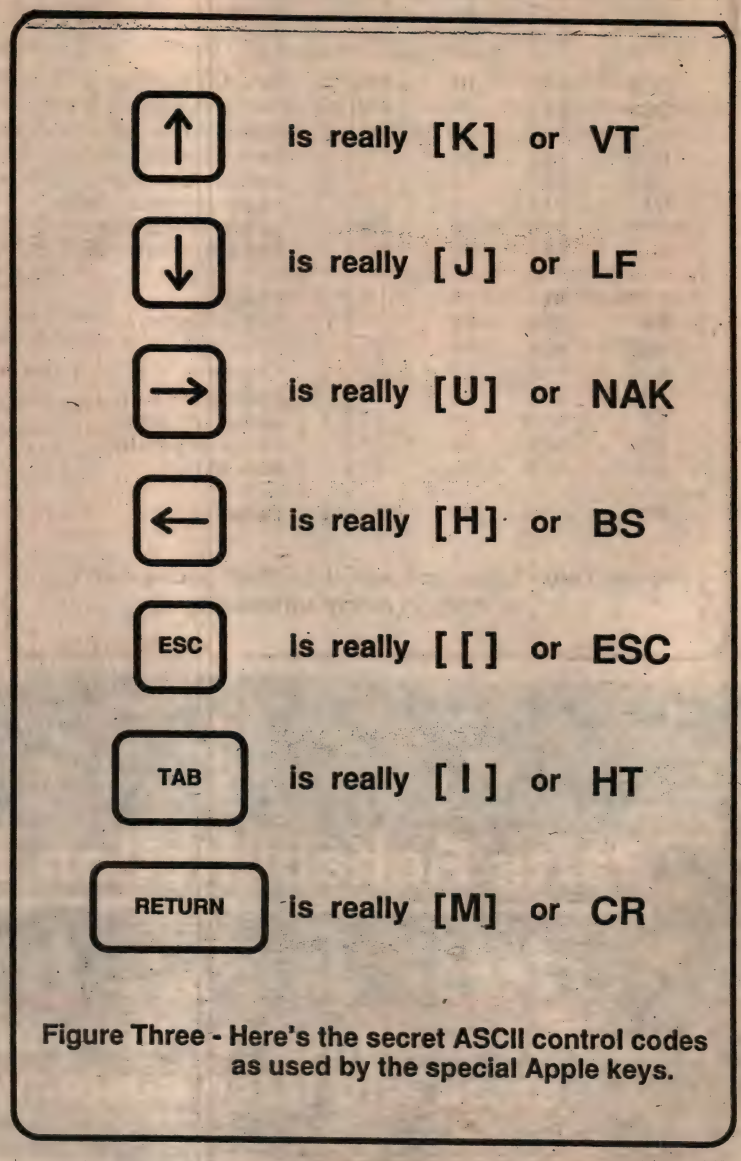
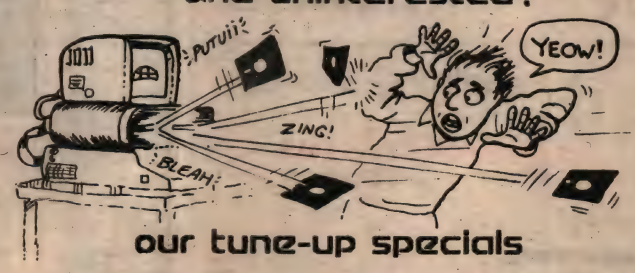


Figure Three - Here's the secret ASCII control codes as used by the special Apple keys.

disk drive acting irregular,
intermittent,
and uninterested?



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So, it would seem that typewriters do not have carriage returns, but personal computers do.

Today, of course, most carriage returns are really combined carriage returns and line feeds. Most word processors and printer drivers usually give you a choice of how many line feeds to use. This often can eliminate any line skipping or line overwriting problems.

Just to thoroughly confuse you, ASCII is a *seven* bit code that has only 128 defined states. Since most personal computers work with eight data bits at once, the remaining most significant bit, or MSB, is free for special use by the system designer.

This eighth MSB can be used to tell the difference between a key pressed and not pressed, between normal and inverse text on a screen, to mark the end of a word processing screen line, to tell the difference between Applesloth tokens and real text, or in any of many other ways the system designer may choose.

Thus, there are two different ASCII codes, depending on who uses the MSB for what. If the MSB is zero, we are using *low ASCII*. Low ASCII is often used for standard non-Apple textfiles, and for use with Apple textfiles when under ProDOS.

If the MSB is a one, we are using *high ASCII*. High ASCII is common in older Apples, both for the normal screen display and for DOS 3.3 textfiles. Since many third party printer cards expect high ASCII as input, ProDOS Applewriter 2.0 had to be upgraded to version 2.1 to make sure these cards would not get confused.

Note that high ASCII and low ASCII differ by hex $80 or decimal 128. A high ASCII carriage return is decimal 141 or hex $8D.

OK, How Did You Do It?

Ah! We have a typesetter in the audience. Section WW, row X, seat 97. The one with the green eyeshade and the ink all over their hands.

Figure two is *very* hard to typeset on most of your big mutha typesetting machines, because of the proportionally spaced text. For a good example of how *not* to do this, check page 26 of my *Enhancing Your Apple II&IIe*, Vol. II (SAMS #22425). If you try to bracket or put a hex on a proportional typefont, the columns will all end up ratty.

Do they ever.

Once again, it is *Applewriter* to the rescue.

Since it doesn't matter in the least which direction you build up a *Laserwriter* bitmap im-

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age, you simply work directly with each *column*, rather than with each *row*. Which ends up far easier and far faster.

Now for the tricky part.

Each column in the figure is treated as an *individual and very narrow paragraph*. The ASCII column paragraph is left justified.

The HEX column paragraph is fill microjustified, placing a space between the $ and the firt numeral and a second space after the first numeral. The spaces automatically get compressed just enough to keep all of the hex values at an exact constant width, yet still hold attractive characters that are spaced proportionally.

Note that the spaces get squashed bunches, rather than your usual stretch.

The *Dec* column is right justified. The *Key* column is fill justified by using an opening bracket, a space, a symbol, another space, and a closing bracket. Once again, the pair of spaces get squashed just enough to keep the brackets at a constant width. The final *Use* column is left justified.

Total user time? Around fifteen minutes for the entire figure. This could be sped up further with some practice and a little help from WPL. Note that this *entire* figure was typeset; no pasteup was involved.

One very big advantage of working by columns is that the content of any column holds identical stuff, while the usual row holds a mishmash of wildly conflicting character strings.

In fact, this *entire* Guru column was written, "drawn" and *typeset* on an *Apple IIe*. And, yes, that includes all of the final "camera ready" artwork as well. Even the initial cap.

Neat, huh?

Alas and alack. It looks like we are fresh out of carriage returns for this month.

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TV Talk Show Host Turned Software Publisher Announces Software Golden Oldies — Volume 1

Mix a television talk show host and Grammy Award winner with today's computer technology and what do you get? Les Crane's *"Software Golden Oldies Volume 1."* The floppy disk/paperback book package features the original, uncut, authorendorsed versions of Adventure, Eliza, Life, and Pong--programs that changed, forever, the way the world plays.

Published by Software Country of Beverly Hills, California, the $29.95 package also presents new and old computer users with a historical perspective of these breakthrough programs. The book reprints chapters from Tracy Kidder's Pulitzer Prize winning *"The Soul Of A New Machine,"* Stephen Levy's *"Hackers," Scott Cohen's "Zap! The Rise And Fall Of Atari,"* William Poundstone's *"The Recursive Universe,"* Steve Ditlea's *"Digital Deli,"* articles from the *Whole Earth Software Catalog*, and pages for maps, graphs and notes.

Software Country President said, "These programs are to software what 'Rock Around the Clock,' 'Shake Rattle And Roll,' and 'Heartbreak Hotel' are to rock music: the beginning of an era."

Something of a "Golden Oldie" himself, he is no stranger to the music industry. He coined the term and created the now obiquitous "Top 40" radio format in the fifties. Twenty years later, he won the "Grammy" for *Desiderata*, the best spoken recording of 1972.

In between, he had one of the most daring talk shows on TV. In 1964, he launched ABC-TV's first venture into late-night network talk show programming. "The Les Crane Show" aired Monday thru Friday opposite "The Tonight Show." Packing his trademark, the famous "shotgun" microphone, he created such a powerful image that *Look* magazine went so far as to characterize him as "Television's Bad Boy." (Nov. 3, 1964, Vol. 28, No. 22)

Software Classics

Eliza was written more than 20 years ago by M.I.T. Professor Joseph Weizenbaum who astounded the scientific community with this pioneering artificial intelligence program. The program simulates a conversation with a Rogerian therapist.

John Horton Conway wrote Life more than a decade ago. The program, introduced to the world through articles in *Scientific American* and *Time*, has since been described as both a game and video art form.

In 1972, electronics engineer Al Alcorn created the video game Pong for Nolan Bushnell's fledgling company, Atari. It became a national craze.

Adventure is the granddaddy of all computer interactive fiction games. Players explore

continued on page 188

Forth-Based Hardware And More At Forth National Convention September 20-21, 1985

Several innovative new Forth-based products were demonstrated at the recent Forth National Convention in Palo Alto, California. Novix (Cupertino, CA) announced the release of their Gamma Board Kit, a fully tested preproduction version of the NC4000, the single-chip Forth engine that executes Forth directly. Charles Moore, the inventor of Forth and designer of the Novix chip, demonstrated his hand held keyboard. With only six (6) "keys" it can be operated by moving only one hand. National semiconductor (Santa Clara, CA) demonstrated its ROM-based Forth system. This Forth-based building block provides the hardware for program development in a Forth environment. The Institute for Applied Forth Research (Rochester, NY) announced the release of the refered Forth journal, **The Journal of Forth Applications & Research** (V.3, #1).

"Applications of Forth in Space" was the topic of a panel chaired by Elizabeth Rather of Forth, Inc. (Hermosa Beach, CA). Henry Harris of Jet Propulsion Laboratories discussed how and why Forth was used to program the Interactive Measurement Payload Shuttle (IMPS). IMPS was developed for the Air Force and will be deployed by the space shuttle in 1988. It measures particles at the earth's polar regions. Greg Schmidt of The University of California, San Diego discussed Forth and the development of the Faint Object Spectrograph. This spectrograph is one of the five instruments on the space telescope. Robert Wood, of McDonnell Douglas' Electrophoresis Operations in Space (EOS) project, detailed the development of the world's first space factory. Mr. Wood, the first programmer in space, is scheduled to fly with the Space Shuttle in 1986.

A discussion of Forth and the Fluoroscopic X-Ray Image Enhancement Processor led by Ken Arnold of HiTech Equipment Corp. (San Diego, CA), explored how Forth-based hardware aids medical diagnostic imaging. Artificial intelligence, expert systems and Zoomracks, a new software metaphor based upon Forth, were also featured. The convention closed with a "Fireside Chat" by the creator of Forth, Charles Moore.

The convention was sponsored by FORTH Interest Group (FIG), a non-profit organization with over 5,000 members and 80 chapters worldwide devoted to the Forth computer language. FIG publishes **FORTH Dimensions**, a bi-monthly publications, and provides group health insurance, an on-line data base, a job registry, and a large selection of Forth literature. Contact the FIG HOT LINE (408) 227-0668 or write PO Box 8231, San Jose, CA 95155.

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Stride Beefs Performance Of 400 Series

Stride Micro, formerly Sage Computer, announced recently that a faster processor and more memory will now be standard features on all models of their popular 400 Series of supermicros.

Effective immediately, all Stride systems will be shipped with a 12 MHz 68000 microprocessor, replacing a similar 10 MHz chip. The new chip increases Stride's already impressive benchmarks by up to 20 percent (20%). The 12 MHz processor had previously been offered by Stride as an option.

To complement the increased performance, a "CACHE Disk" feature has been added and the minimum memory on all systems has been boosted from 512K bytes to an impressive one megabyte (1M byte). In announcing the no-cost RAM upgrades, Stride said that recent enhancements to the 400 Series' operating software will permit customers to take full advantage of existing "RAM Disk" and the new "CACHE Disk."

Rod Coleman, president of Stride, admitted that the concept of "disk caching" is not unique, but that Stride's implementation is the first that allows software to utilize significantly large amounts of RAM to realize true performance gains. Additional RAM expansions are available for the 400 Series in 2, 4, 8, and 12 megabyte options. In conjunction with the increased minimum RAM, pricing has been lowered on all optional expansion memory to a suggested retail of approximately $1,200 per megabyte.

The Stride 400 Series is a powerful and extremely flexible line of 68000 systems for business and industry that range in price from $2,995 to over $70,000. The entry level system features the 12 MHz processor, VMEbus, 1M byte of RAM, multiuser (4 serial ports and 1 parallel port), a 640K byte floppy, and the p-System operating system.

Options permit expansion to 12M bytes of RAM, 20M bytes to 448M bytes of Winchester hard disk storage, a 16081 floating point processor, a memory management unit, a second floppy, streaming tape backup, Omninet Local Area Network, 10 to 22 serial ports, graphics and a dozen different operating systems. The 400 Series is particularly well-suited for use with UNIX System V, CP/M-68K, RM/COS, BOS, PDOS and S1 operating systems.

Stride Micro, formerly Sage Computer, was founded in 1981 to manufacture and market high performance 68000--based microcomputer systems at highly competitive prices. Stride headquarters are located in Reno, Nevada, with regional offices in Boston, Dallas, Chicago, Los Angeles and London. International distributors are located in over 35 countries worldwide.

For additional information contact Stride Micro, 4905 Energy Way, Reno, NV 89502, (702) 322-6868.

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Industrial Temperature CMOS From S-MOS Systems

A 64 kilobit static random access memory with an industrial temperature range from minus 40 degrees to 85 degrees Celius and a maximum access time of 150-200 nanoseconds is now available from S-MOS Systems of San Jose.

The 8,192 words by 8-bit device, called the SRM 2064CT15/20, is made with S-MOS Systems' two micron complementary metal-oxide semiconductor process.

The SRM 2064CT15/20 has typical operating current of 40 milli-amps and typical standby current of 100 micro-amps. A battery-backup data retention mode is available, where the data retention current is only 50 micro-amps maximum at two volts.

The SRM 2064CT comes in a standard 28-lead dual-in-line plastic package. In 10,000 piece quantities, the SRM 2064CT15 costs $5.50.

For more information, contact Chee Ho, product marketing manager, standard products, S-MOS Systems, 50 W. Brokaw Road, Bldg. 7, San Jose, CA 95110. Telephone (408) 993-1212.

Mention that you read about it in *COMPUTER SHOPPER*. ●

Expert System Helps Strategists to Win in Inimical Domains

Reprinted from AI Letter, from T.I. Data Systems Group.

When Tom Landry, coach of the Dallas Cowboys, ponders his famous play card during a game, he's planning in an inimical domain. So are you, when you play chess or tennis or Monopoly. All these domains of knowledge and strategy are "inimical" because they involve opponents intent on knocking your carefully made game plans into a cocked hat.

Planning a *friendly* domains is relatively straightforward, and has been done with such systems as PERT, on conventional computers, for more than 30 years. Hitches frequently occur — schedules slip, shipments are lost, the weather changes — but thorough planning can provide for these "routine emergencies" and corrective actions.

Inimical domains are far more complex, especially in the great variety of possible opponent responses, and the radical shifts in possible outcomes that each response causes. Even Tom Landry has been known to adjust his game plan after an opponent has scored 21 unanswered points in the first quarter.

It appears now that expert systems technologies are ideally suited to tackle the kind of fast-changing planning required for success in an unfriendly contest. Expert systems form a branch of Artificial Intelligence science. AI seeks to endow computers with human-like abilities, from the ability to speak and understand human language, to the ability to learn from experience. Specifically, expert systems are aimed at simulating the endowments of a human expert, including wide-ranging knowledge, well-analyzed experience, and the ability to apply that experience to situations and thereby predict their probable outcomes.

In the Artificial Intelligence Research branch at Texas Instruments, Rajendra S. Wall and a team are developing an expert system that will help teach humans to plan successful strategies in many inimical domains. The first system they've constructed is called the "Command, Control, Communications and Intelligence (C^3I) Testbed." The name has a military sound — after all, war is the unfriendliest contest of all — but the general principles and computer programming being developed can be applied just as well as competition in business, sports, games, and medicine (where the opponents are viruses, tumors, bacteria, and the like). As an aside, Winston Churchill's doctor reported that while recuperating from a wartime illness, Churchill was as fascinated by his daily white-cell count as he was by reports of enemy planes downed.

The system at TI presently runs on multiple LISP machines — LISP is a language favored by researchers working with expert systems. It's structured primarily to handle the symbolic reasoning necessary to work with words and ideas, in contrast to conventional computer languages that are structured to manipulate numbers. Each player in the present conflict situation sits at a LISP machine and commands a squad of soldiers fighting in a small city.

There are two common ways to approach such a conflict. An inexperienced sergeant can search through his imagination for every possible response to the enemy's latest action, guess ignorantly about the possible outcomes, and finally choose the tactics that look best. This approach was taken all too often during the War Between the States, at all levels of command on both sides, and tragically prolonged the war. In contrast, an experienced sergeant or one who has been thoroughly trained to profit from the cumulative well-analyzed experience of others, can quickly appraise the situation, consider the few most likely moves, and choose the one most likely to succeed. This is the approach that C^3I will be able to teach.

Just as great military teachers from Clausewitz and Mahan to Billy Mitchell and Mao TSe Tung have done, C^3I analyzes the historical conflicts in its experience bank. Weapons systems have achieved great sophistication during this century, but many strategic principles are timeless. The strategies of delay and avoiding battle until the propitious time employed by the Roman General Fabius the Cunctator to defeat Hannibal in the Third Century B.C. are not essentially different from those used by Marshall Zhukov to defeat the Nazis before Moscow 22 centuries later.

Such experiences are input to the system's knowledge base by human domain experts, who abstract the experience and classify them for retrieval by the system as it needs to apply them to new situations. A look at some of the basic classes of experience, and familiar examples (which aren't necessarily used in TI's system), will help explain how it coaches:

"Start-up" experiences are short, sharp, and simple. The attack on Pearl Harbor, for example, might teach the advantage of surprise. It could also teach the benefit of elementary preparedness, and show from other experiences how easily picket ships cruising offshore could have given early warning to blunt the attack.

"Reference" experiences are

continued on page 186

MUMPS Quarterly Focuses On Implementations

The new MUMPS quarterly, *1985 Standard MUMPS Implementations: Software Tools in the MUMPS Environment,* was released recently.

The 74-page volume is highlighted by a 20-page section comparing more than 40 implementations that are now available as well as the hardware involved.

The evaluations include an examination of the computer systems, properties of the MUMPS lamguage implementation and the environment in which MUMPS will run.

"Application Development Tools," the next major section, focuses on application and program generators, including *Framework,* a development environment that can be used by non-programmers to build highly complex applications, and *Epic,* an application builder that can create a system capable of handling all database functions.

The third section, called "Database Systems and Tools," discusses initially a software development system known as *AIDA* (Adaptive and Interactive Development of Applications), which enables users, without much programming, to develop an information processing system.

Also examined is the design of a simple algebra-based relational database facility in MUMPS, a programmerless database management system for clinical environments, and a display-management system that enables users to rapidly create screen applications in MUMPS.

"Programming Aids," another major section, looks at various utilities developed by the largest team of MUMPS experts in England, at a package of programming aids to help in the development and documentation of MUMPS programs, and at a system for managing aspects of routine development, storage and distribution.

The final section, "The MUMPS Environment," reviews the issues of local area networks on IBM PCs and compatibles and also describes a method for coding recursive algorithms in MUMPS, using the "NEW" command.

MUMPS, originated as the Massachusetts General Hospital Utility Multi-Programming System, is both a programming language and a data-management system notable for powerful string-handling and file-manipulation facilities.

The language is used in more than 10,000 medical, commercial and industrial applications worldwide, in addition to a growing number of PC configurations.

1985 Standard MUMPS Implementations: Software Tools in the MUMPS Environment is available from the MUMPS Users' Group, Suite 510, 4321 Hartwick Rd., College Park, MD 20740. The price is $6.60, including shipping and handling. For further information, call MUG at 301-779-6555.

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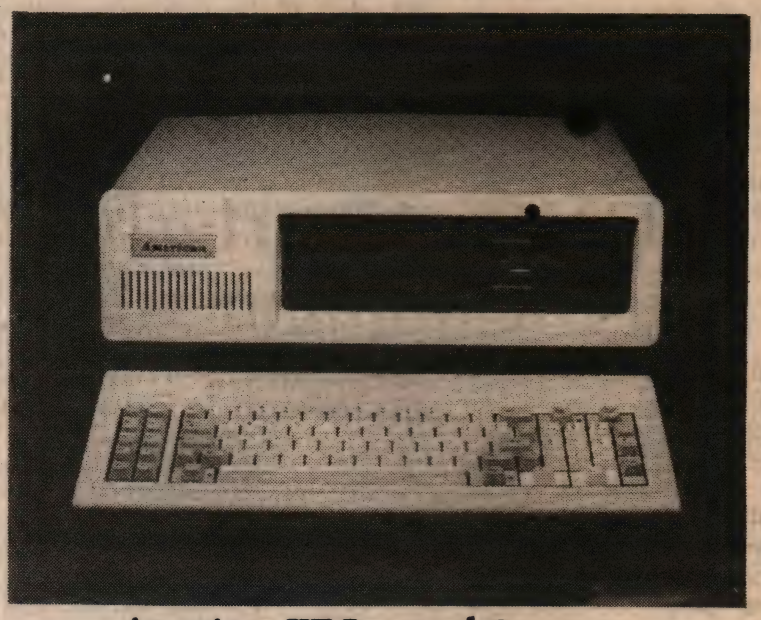
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Hayes To Support X.25 And X.PC Protocols

Garry Betty, vice president marketing and sales of Hayes Microcomputer Products Inc., of Norcross, GA, recently announced the company's support for two protocols for personal-computer communications. The announcement was made at the National Computer Conference here.

Communications protocols are sets of rules that allow two systems to establish and maintain communications.

Betty stated that the company will support the X.25 protocol, the standard approved by the International Telegraph and Telephone Consultative Committee (CCITT). Hayes will begin using X.25 as personal-computer communications become synchronous. For asynchronous communications, Hayes will adopt the X.PC protocol.

"We used several important criteria in making our decision to support X.PC," said Betty. "These include our belief that an asynchronous protocol should be compatible with international standards and that it should be non-proprietary, so that vendors can adopt it economically. Further, we wanted a protocol that would support advanced personal-computer applications, such as fast and reliable electronic banking transactions and multiple sessions between a host and a personal computer. X.PC best fits all these criteria.

"X.PC is particulary attractive to us because of its similarity of X.25. This similarity will allow software developers using X.PC to begin developing applications that take advantage of the functionality of X.25," Betty said.

Betty also stated that the company will continue to evaluate its position on support for additional protocols. "Responding to our customers' needs is very important to our company," said Betty. "Our products will continue to provide the features and benefits that our users require."

Further, Betty said that the company's future software products will be compatible with all Hayes software using its current protocols--Hayes Verification and XMODEM protocols.

The leader in the microcomputer modem market, Hayes supplies and supports hardware and software that integrate communications technologies into the personal computer environment. The employee-owned company distributes its products through a national network of authorized computer dealers.

For more information contact Hayes Microcomputer Products, Inc., P.O. Box 105203, Norcross, GA 30348, (404) 449-8791.

Mention that you read about it in the *Computer Shopper*. ●

The New And Updated 1985/86 Bar Code Industry Directory Now Available

The annual 1985/86 Bar Code Manufacturers and Services Directory is now available from the publishers of the bi-monthly magazine *Bar Code News, The Journal of Keyless Data Entry*. This annual Directory published in August 1985, contains 305 companies---listings from every major bar code manufacturer and service. Information can be found on companies that manufacture complete bar code systems, scanners, printers, data collection terminals, film masters, labels and label testers, seminars and consultants, software and data base publications. Additionally, this year's Directory has been expanded to include non bar code automatic identification products such as OCR, Vision, Voice, "Smart Cards," magnetic stripe, MICR, OMR, etc. Each entry consists of a brief description of the product line or service; general information about the company; and the name, address and phone number of a knowledgeable representative.

Bar code applications are proliferating and in some cases becoming mandatory. They are going far beyond the grocery/retail trade into industry, government, libraries, hospitals, and laboratories. The technology is appropriate in any area where manual data entry is presently used. North American Technology is at the forefront of this new technology as publishers of the 250 page book *Reading Between The Lines: An Introduction To Bar Code Technology*, the bi-monthly magazine *Bar Code News*, and the *1985/86 Bar Code Manufacturers And Services Directory*. The Directory is available for immediate delivery at a cost of $39.95.

For additional information contact Bar Code News, 174 Concord St., Peterborough, NH 03458, (603) 924-7136.

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Expert System continued from page 184

much more complex. As in all classes, failures are analyzed as well as successes. Napoleon's plan for Waterloo — dividing the Allied and Prussian forces, then defeating them separately — might be used as an experience to illustrate problems of confronting two opposing forces.

"Model" experiences are sets of events that have happened so often in such similar ways, that the lessons learned are classic. The problems of a frontal attack against a well-fortified defense, for example, can be abstracted from experiences of the French knights at Agincourt, the charge of the Light Brigade at Balaklava, and the trench warfare of World War I.

"Counter-example" experiences are taught only after "Model" principles are well-learned. Counter-examples teach why Model principles sometimes fail, or why violations sometimes succeed. Lee's division of his forces at Chancellorsville was a violation that worked. So was MacArthur's unorthodox choice of Inchon for an amphibious landing.

"Anomalous" experiences is a classification that holds new tactics awaiting analysis. Although most of the tactics employed in Vietnam are centuries old, complex combinations of modern weapons occasionally give rise to new tactical opportunities.

C³I has many capabilities for relating these experiences to the situation under discussion, and for explaining the relationships using text, maps, and graphs.

You might not want to use C³I in the middle of a football game or a battle — but it would be comforting to know that your coach or commanding officer had won his battles on the playing fields of C³I.

Glossary of Expert System Terms

Backward-Chaining is a method of searching for the value of a goal parameter. The search begins with the goal parameter and traces only the parameters relevant to the rules necessary to infer the value of the goal.

Certainty Factors (CF) is a numeric value that indicates a measure of confidence in the value of a parameter on the part of the consultant or the client.

Client is the person who finds a solution to a problem using the inference engine and a knowledge base.

Consultant is the individual whose expertise in a field of knowledge is used to build a knowledge base. This person may also act as the knowledge engineer.

Consultation is the process of finding a solution to a problem using an inference engine and a knowledge base.

Development engine is the part of the software tool that enables the knowledge engineer to build, update, and save a knowledge base.

Domain is the problem area whose solution is addressed by the knowledge base and the inference engine.

Expert System is a software program that uses the expertise of one or more experts to infer a solution to a problem in a specific domain.

Forward-Chaining is a method of determining a parameter's value by evaluating the action of a rule when the premise of the rule is true. This method does not cause tracing of the parameters within the premise of the rule.

Heuristic is a technique or assumption that is not formal knowledge, but which aids in finding the solution to a problem.

Inference is the logical process of reaching a conclusion using rules based upon accepting the truth of preceding conclusions or facts.

Inference Engine is the part of the software structure that applies the knowledge base expertise to the client's information to infer a solution to the problem.

Knowledge Base is the computer representation of the consultant's domain knowledge. Contains parameters (facts), rules, and user-defined functions.

Knowledge engineer is the person who specializes in designing and building expert systems in conjunction with the consultant.

LISP is a computer programming language preferred by AI researchers and developers for working with AI techniques.

Parameters are the facts that take on specific values during a consultation (variables). Parameters are the predefined attributes of the problem domain.

Rule is a combination of facts, functions, and certainty factors in the form of a premise and an action. ●

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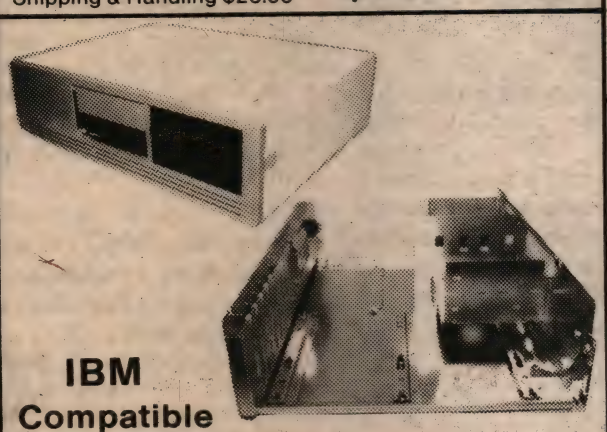
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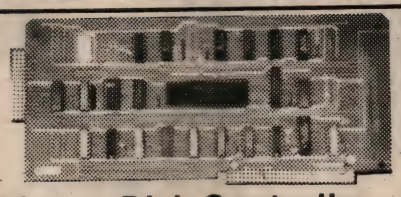
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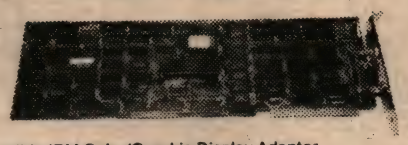
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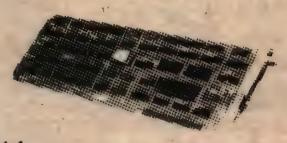
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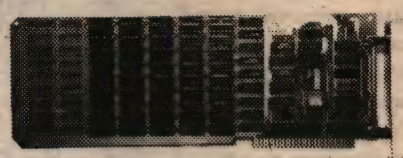
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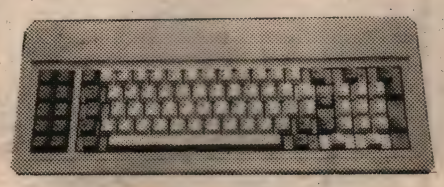
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New Microsoft Macro Assembler Offers Increased Speed and Performance

Microsoft Corporation announced recently a new, high-speed version of its Macro Assembler language. "The new release, Microsoft Macro Assembler 4.0, is three times faster than the previous version, making it the fastest MS-DOS Macro Assembler available," accoring to Sandra Jacobson, Microsoft's Systems Languages Product Manager. "The increased speed was achieved by writing the new version in Microsoft C and fine tuning in our assembler," said Jacobson, "the increased speed, combined with the new utilities, make version 4.0 the best value in software development tools."

New features allow users of Version 4.0 to assemble larger source files, with more symbols and more macro text. In addition, new assembly switches make the assembler both more convenient to use and more efficient. Microsoft has also revised the documentation to add more programming examples and included the "Intel Programmer's Pocket Reference Guide," a 90 page reference document for Intel microprocessors.

Included is Microsoft's powerful Symbolic Debug Utility which allows source level debugging of programs written using the Microsoft C Compiler, FORTRAN, Pascal, or Macro Assembler. Another major enhancement is screen swapping which permits easy switching between the debugging screen and the application output, which is specially useful for graphical applications. It also offers 100 percent source and object upward compatibility with earlier Microsoft and IBM Macro Assemblers.

Microsoft Macro Assembler 4.0 runs on and supports feature of any MS-DOS computer supporting the newer 80186, 80286, and 80287 instruction sets as well as the standard 8086, 8087, and 8088 instructions. The assembler comes with a full set of utilities, including an interactive source level symbolic debugger, linker, program maintenance utility, library manager, cross-reference utility, and exefile packing utility and exefile header utility.

Microsoft Macro Assembler 4.0 requires 128K of RAM, one floppy disk drive (although two are recommended), and MS-DOS 2.0 or higher.

The product retails for $150. Registered owners of previous versions of the Microsoft, IBM, Texas Instruments or Zenith versions can upgrade to 4.0 for just $75. For more information contact Microsoft at 1-800-426-9400 (in Washington, call (206) 828-8080), or write to Microsoft Corporation, Customer Service Department, 10700 Northup Way, Box 97200, Bellevue, Washington, 98009.

Microsoft Corporation manufactures and sells a wide range of software operating systems, languages, application programs, books, and hardware for the microcomputer marketplace.

New Macro-Assembler features include:

- Up to 3 times faster making it the fastest Macro Assembler for MS-DOS.
- **Larger Source Files.** The new Microsoft Macro Assembler lets users assemble larger source files than before, with 15 percent more symbols and up to 400K of macro text.
- **New Assembly Switches.** Several new assembly switches improve both performance and convenience, by:

- Letting users set file buffer size anywhere from 1K to 63K (depending on program size), to speed the assembly of smaller programs.
- Defining search paths for the INCLUDE command, so files can be included from other directories.
- Letting users set values for conditional assembly directives through the command line instead of having to go back into the code.
- Checking for "impure" code (code written to an unwriting segment) in 80286 protected mode. Alerting the user at the time the bode is being written saves time by preventing execution failures later.

- **Conditional Error Directives.** Users can now check for conditional errors (involving parameters, boundaries, and other assembly-time values) at any point in the program development process.

More Powerful Utilities

The new release of the language is accompanied by enhanced utilities. These include:

- **Symbolic Debugger.** Microsoft's interactive symbolic debugger, which can be

continued on page 189

AT&T To Announce Co-Labelling Of Unify RDBMS

Unify Corporation and AT&T Information Systems announced at the UNIX Expo show an agreement whereby the UNIFY Relational Data Base Management System will be co-labeled and offered directly by more than 4,000 AT&T account executives across the country, according to Curtis Weeks, executive director of AT&T Information Systems.

"We are very pleased to announce that UNIFY will be sold by AT&T's sales staff," said Unify President Nicolas Nierenberg. "Many successful applications have been developed using UNIFY and AT&T 3B computers. We now expect those numbers to increase significantly."

According to Weeks, "It's important for us to make the best software tools available to people using AT&T computers. UNIFY is recognized as one of the most powerful DBMS available for the UNIX operating system. We are glad to be able to offer UNIFY directly."

Unify Corporation is a leading supplier of high performance professional application development tools. In three years it has come to dominate the UNIX market for DBNMS with its first tool, UNIFY, available on over 100 computers. UNIFY, designed specifically as a high-performance RDBMS for multi-user computers, has been chosen by over 50 computer manufacturers, including IBM, AT&T, DEC, NCR, Honeywell and Tandy.

For additional information contact Unify Corporation, 4000 Kruse Way Place, Building Two, Lake Oswego, OR 97034, (503) 635-6265.

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TV Talk
continued from page 182

the deep and twisted recesses of Colossal Cave gathering treasure while attempting to outmaneuver the danger lurking at every turn. Written in 1975, by Will Crowther and Don Woods, Adventure is one of the original programs responsible for launching the home computer revolution.

Collector's Item

graphics and even a "panic button" that instantly calls up a spreadsheet during any game in progress. (Just in case the boss walks in.) The $29.95 floppy disk/paperback book package is available for the IBM-PC and compatibles, the Apple family, Atari and Commodore. Available in most popular computer stores, the program can also be ordered by calling 1-800-245-2057; in California 1-800-245-2056.

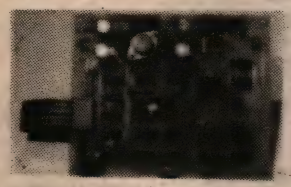
Software Country's first program, "I Ching, The Book Of Change," was published in 1984. This unique publication is the first complete, computerized version of the ancient Chinese philosophical system.

For more information contact Software Country, 270 North Canon Drive #1297, Beverly Hills, CA 90020, or call (213) 278-8450.

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Kalglo Electronics Co., Inc. announced its new UL(r) Approved Mini-II plug-in surge suppressor.

This small affordable unit boasts capacities usually found only in much more expensive devices. The compact Mini-II responds in 5 nano seconds, suppresses 13,500 pulse amps and has a capacity of 135.0 Joules. Clamping starts at 150 volts (more than enough safety for delicate microprocessor power supplies), and its filtering circuit removes 41dB of "noise" at 10MHz on common mode and 49dB on normal mode. Once plugged into a wall outlet, the unused receptacle receives the same protection as the two on the Mini-II, resulting in three protected outlets. The versatile Mini-II provides high quality protection for myriads of applications, including plug-in computers, lab equipment, office copiers, word processors, stereos, TV's and lap-tops for those on the go.



For additional information contact Kalglo Electronics Co., Inc., 6584 Ruch Road, Bethlehem, PA 18017-9359, (215) 837-0700.

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Protocol Converters Support Async Terminals and Printers



Two protocol converter models gaining quick acceptance with Black Box customers are the PQ-5(B) bi-directional terminal interface and the PQ-5(RO) receive only printer interface, both just introduced early in 1985.

Versatility is the hallmark of the PQ-5(B). This device enables the user to incorporate a bi-directional asynchronous terminal into an IBM SDLC twinax network. Because cable-through and line termination are supported, the asynchronous device may be used as an intermediate or terminating device in the twinax string. Software for this device has both a generic synchronous and a terminal dependent mode. The supported terminal will emulate an IBM 5251 Model II, whichever mode is used. Terminal-dependent software is available for a wide range of asynchronous terminals.

The receive only PQ-5(RO) enables Systems 34, 36 and 38 5251, remote model 12's and/or Series 1 (twinax) computers to interface with RS-232 printers and other receive-only devices. Black Box offers a wide range of PQ-5(RO)'s that can interface with such letter quality printers as NEC, Diablo, Data Products, QUME, A.B. Dick and Xerox, along with dot matrix and most serial printers, embossers and plotters (such as HP and Tektronix) used with the IBM systems mentioned.

Which protocol converter can solve your need? Black Box technical support people can help you make that determination and select the device to fit your particular situation. For more details on either the PQ-5(B) or the PQ-5(RO), or a free copy of our catalog containing more than 500 other problem-solving devices, write: PQ-5(B) or PQ-5(RO), Black Box Corp., PO Box 12800, Pittsburgh, PA 15241. Call (412) 746-5530.

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New Microsoft
continued from page 188

used for source level debugging with Microsoft high-level languages as well as Macro Assembler, saves time by letting users refer to symbols and line numbers instead of hexadecimal addresses when debugging their programs. Two new features have been added to this utility:

- Screen swapping, which makes the debugging process quicker by letting users switch easily between the execution screen and the debugging screen.
- Simultaneous display of both the original source code and the resulting disassembled code, including accompanying comments. This feature is especially useful for debugging programs written in Microsoft high-level languages--C, FORTRAN, and Pascal.

● **Linker.** The new linker is up to 25 percent faste than the previous linker and includes two new switches:

- **/EXEPACK,** which creates small executable files by packing sequences of repeated characters, and optimizing the relocatable information.
- **/HELP,** which explains the linking options available.

● **Cross Reference Utility.** This utility, which creates a cross-reference listing of the definitions and locations of all symbols in a program, now uses all available memory instead of being restricted to 64K. This not only makes it faster but also lets users cross reference larger programs than before.

● **Program Maintenance Utility.** Microsoft's Program Maintenance utility, which can control rebuilding programs whenever source files are changed, works with Microsoft high level languages as well as with Macro Assembler. The new version adds support for:

- Macro definitions, allowing users to maintain a large number of programs with just one maintenance file by using symbolic names for file names.
- Inference rules, letting users enter conditional commands just once, together with the rules for applying them, instead of having to repeat them throughout a program.

● **Library Manager.** The library manager, which allows programmers to create, organize, and maintain object module libraries, works with modules from Microsoft high-level languages as well as from Macro Assembler. The new release has been enhanced for improved performance.

● **EXE File Utilities.** Two new utilities have been added to support executable files--one to pack them and one to let users modify file header specifications (minimum and maximum memory allocation, stack size, etc.).

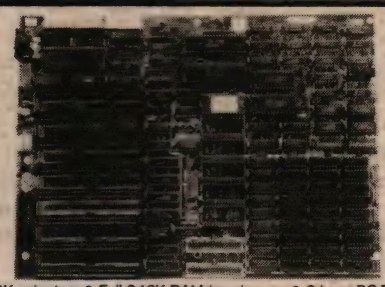
For more information contact Microsoft Corp., 10700 Northup Way, Box 97200, Bellevue, WA 98009.

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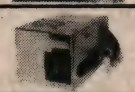
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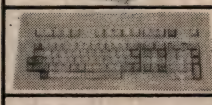
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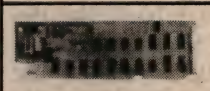
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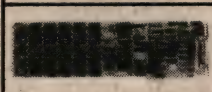
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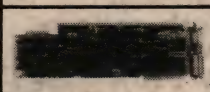
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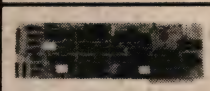
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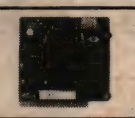
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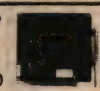
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Teacher's Computer Gradebook

by Frank Dutton

When a couple of my teacher friends were complaining recently about the headaches of the final week of a grading period, when they had to give and grade tests as well as compile the grades for their classes' report cards, I write this program as a Computerized gradebook.

The report which lists the students in a class by grade ranking can be used to keep parents and students informed if a student is failing a class during the course of a grading period (as is required by Texas law). The same report can also provide student incentive through a system of seating arrangement by grade ranking, which is revised periodically (e.g. weekly), and which allows the students to graphically view their position in class via their seating position.

A few minutes spent daily entering the appropriate grades to this program will keep the grades for all classes up to the minute. According to the parameters entered by the teacher, this program also weights the various grades issued and allows as many grade types for a given class as may be desired by the teacher. When report card time rolls around, a printout from the program will show the grade average for each student for all grade types in a class (e.g. Class participation, Homework, Tests, Extra Credit, etc.), as well as an overall class grade determined when the averages of all grade types are combined and weighted relative to the importance of each. The program is operated from a main menu, and all necessary entries are prompted onscreen, making it simple enough for operation even by those who are not comfortable with computers. The directions for program usage which follow will tell the novice user more than is necessary for operation of this utility. But complete familiarity with the operation of the program will help ensure that the desired results are obtained.

The Teacher's Gradebook program begins with a main menu from which all options are selected. Further input to the program is explained and prompted onscreen at the proper time. The Main Menu is reproduced following the text of this article.

To begin using this program, the first step is to enter the names and specifications for all classes. Select menu operation number 1, and all classes presently entered will be listed by name, and the user will be offered the option of adding another class. A class name may be up to 25 characters/spaces in length. Following entry of the name of a class, the number of grade types for a class must be entered. If a class is to receive grades for (1) Class participation, (2) Homework, (3) Class tests, and (4) Special assignments, then the number '4' should be entered as the number of grade types. All grades which may be assigned to the class must be taken into consideration at this time and allowance made for them. It is not necessary to utilize all grade types entered, but additional grade types may not be entered later. At the next prompt, the name of each grade type is to be entered and may be expressed with up to 12 characters/spaces for each. After the entry of each grade type name, a weight is to be assigned to each grade type.

The weights are relative to one another, and the numbers assigned each are important only in the ratio which one bears to another. However, it is suggested that, for the sake of immediate clarity, a percentage ratio be used. The relative weights may be changed at any time, and relative weights of '0' may be assigned to some grades, if desirable. The weights assigned for a grade are important insofar as the overall class grade is concerned. The overall grade is expressed as a cumulative average of all grades entered based on their relative weights. If the four previously mentioned grade types were to be used, and relative weights were assigned as: (1) Class participation: 20, (2) Homework: 20, (3) Class tests: 60, and (4) Special assignments: 0, then the following would happen:

A. A grade average for special assignments would be kept, but would not be calculated into the overall class grade. This grade could then be used at the teacher's discretion to slightly raise or lower the overall class grade from the actual average to the next or preceding letter grade level.

B. If the following 10 grades were entered from time to time for class participation (75, 78, 85, 60, 82, 90, 80, 95, 72, 85), then the average for class participation would be shown as 80.2.

C. If the following five grades were entered for homework (85, 88, 72, 98, 95), then the average for this grade would be 87.6.

D. If two tests were taken and the results entered as 80 and 90, the Class tests average would be 85.

E. The overall class average would be calculated as 80.2/(20/100) plus 87.6/20/100) plus 85/(60/100) yielding 84.56.

F. If the weights assigned were, respectively, 1, 1, 3, 0, rather than those previously mentioned, the resulting grades would be the same as the relative weights of the grades that are in the same proportion. Regardless of the relative weights entered for the grades, the average for each individual grade type would be unchanged, as it reflects only the accumulated grade of that particular type divided by the number of entries. Grade averages will remain accurate and, depending on circumstances, may be expressed beyond 3 decimal places in reports. For the sake of clarity, weights and grades should be entered as whole (integer) numbers.

Main Menu Option number 2 may be used at any time to review the names of classes in use and will also display, for each, the grade types in use and the relative weights of each of those grade types. After selecting option 2, the user is presented with a class name and a list of the grade types and weights for that class; when finished reviewing the information for that class, hit the carriage return key, and the information for the next class is displayed.

In the event that it becomes desirable to change the relative weights, menu option 3 may be utilized at any time to accomplish this end. Following this selection from the main menu, a list of all class names is presented, and the user is asked to choose the class for which weights are to be changed. Once the class has been selected, the grade types and current relative weights are displayed, the user may change any or all weights, one at a time. Although the weights may be changed at will, the results of the changes will be apparent only after the next grade is posted to each student in the class as the overall average is calculated and filed only at that time.

As a teacher's schedule may change from time to time, depending on the circumstances, classes may be added at will, or the records for a given class may be deleted by using menu option 4. When this is selected, all records for and reference to the given class is removed. Similarly, main menu option number 7 will accomplish the same end for a student who no longer remains a member of a class. In either case, a list of classes (or students) is displayed, and the number of the one to be removed is entered; no further action on the part of the user is necessary.

Using menu option number 5, it is possible to sort the students in a class by either current overall grade ranking within the class or alphabetically by last name, first name. As with most options from the menu, the user is given a list of classes and asked which is to be sorted. Following the choice of a class to be sorted, the user is asked whether the sort is to be alphabetical or by grade ranking. When the sort is completed, the sorted class file may be listed out to either the CRT screen or to a printer. In addition to the names, the grade averages are also displayed.

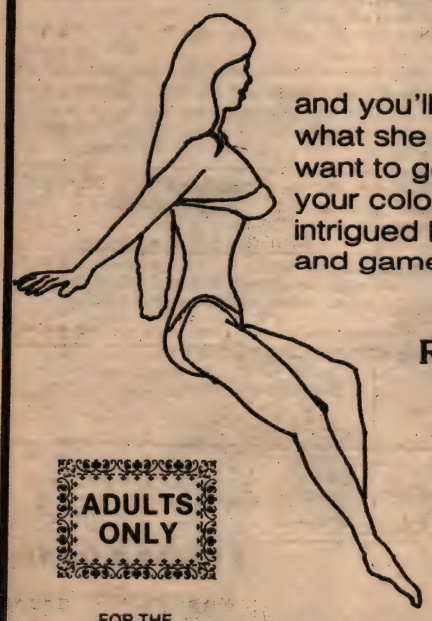
Student names may be entered to a class at will. Menu option 6 is used for this process. Naturally, at the beginning of a school year (or term), the students would all be entered at once. But for those occasions when a student transfers into a class, it is possible to make the addition at any point in time. As with all other processes, the user is fully prompted as to the specific entries to be made at the appropriate times. After a student name is entered, it is re-displayed for final acceptance as a check against incorrect entries. Following the entry of each student name, the user is asked if they wish to continue entering students to the class.

Grades are kept and averaged only from the time a student's name becomes a part of the class file, and it is, therefore, difficult to bring a student into a class after grades have been received by other students and enter a properly weighted set of grades for him. If it is necessary to do this, however, it is possible through a process of numerous entries of grades for this individual student. In this instance, it would first be necessary to determine the grade average desired for the new student for each grade type and the approximate number of grades that have already been entered for the other students in class for each grade type. Then, the same number of entries should be made for the new student, and each entry should be exactly the grade average sought for that particular grade type. After these entries were made, the new student would have the desired grade average, and it would be correctly balanced against the entries that would be made for the rest of the grading period for the given class. Although somewhat a lengthy process, it will treat the student as though he had been in the class throughout the grading period. The entry of grades would be exactly the same as described below for entering student grades; it would be necessary to repeat the grade entry process a number of times for this individual student and skip through the entries for all other class members. Alternately, the program will compute the earned grade averages throughout the balance of the grading period, and at the end of that time, the earned grade may be weighted with the transferred grade to determine the grade to be issued.

The grade entry procedure, menu option number 8, assumes that grades will be entered for the entire class in a single session. Therefore, the name of each student in the given class is presented for grade entry. Even though each student is presented for receipt of a grade, it is not absolutely necessary to make an entry for each; a carriage return or '0'

continued on page 191

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Teacher's Computer continued from page 190

entry is the equivalent of no entry, and nothing is changed with respect to that student or grade. Since a zero is the equivalent of no entry, the lowest grade which can be awarded a student for a given grade type is 0.001. When "Enter grades to a class file" option is selected from the menu, the user is first asked which class is to receive grades. Each member of the given class is then presented in order, and each grade type is offered for entry for the given student. If no grade is being issued at that particular time for the specific grade type, an entry of <CR> or '0' is entered and has no effect upon any averages. As each grade type is presented, the present cumulative average for that grade type is displayed and the user is asked for a new entry, if any. When all grade types have been presented and an entry or <CR> made, the overall cumulative average for the student prior to the entry of the new grades is displayed, and then the new cumulative average reflecting the grade(s) just entered; at this time the user accepts the entries as correct and moves on to the next student or may reject the entries and re-enter the grades for this student. As this program does not keep a permanent record of daily entries, keeping instead only the accumulated averages, and as it may be desirable to have a record of daily entries, there is a facility provided to print a hard copy of newly entered grades as they are being input. After selecting the menu option for grade entry and identifying the class for which entries are to be made, the user will be queried "Shall the grades entered this session be printed out for record? (Y/N)." A yes answer will result in a report being printed listing the class name, a blank for the date, a heading line showing the grade types and a list of each student's last name, first initial, and the grade entries made for each student.

As there may be occasions when a student is given an incorrect grade, provision is made for removing grades from the file by using the procedure of menu option number 9. In most cases, it will be simpler and quicker to adjust a subsequent grade to reflect the difference and enter the adjusted grade in due course, but this facility is provided for those occasions when an important grade is incorrect (e.g. major test grade). When the revision procedure is selected and the appropriate class selected, a list of the students in the class, with corresponding numbers, will be displayed. Select the number of the student for whom the revision is to be entered. The revision procedure then appears exactly the same as the grade entry process EXCEPT that those grades entered during this procedure will be deleted completely. The correct grade would then be entered through the normal grade entry method. If a student received an 89 on a major test rather than the 98 which should have been his grade, the revision procedure would be selected and the 89 entered at the appropriate grade type category. The 89 is then deleted, and there is one less grade comprising the overall averages. When the correct grade of 98 is subsequently entered through the normal grade entry process, all records and averages will be correct as though no mistake had been made.

When a grading period ends and the information has been retrieved for all students in a class for report cards, it is possible to zero-out all grades for that class in one simple operation which allows a fresh start on grades for the new grading period. Simply select operation 10 from the menu, and enter the number of the class to have all grades emptied. Moments later, only the names remain, and the file is ready to receive new grades again.

A quick list of all students' names in a selected class may be obtained onscreen through the use of menu function 11. Menu function 12 is similar, but more complete in scope and provides the teacher with the reporting facility needed to check the grades of all students in a class. In addition to being selectable by itself, the listout procedure activated by menu selection 12 is automatically brought up following any sort procedure. This listing will include the student's last name, first initial, and the average grade for each grade type as well as the calculated, weighted overall grade average for the student. The format is columnar and will be in the order in which the class was last sorted (or, if never sorted, the order in which the students were entered), either alphabetical or by highest overall grade (at the time the sort was made). Menu function 12 allows output to the CRT or to a printer.

A word concerning the number of grade types available for each class is in order relative to the printed (or screen) listings of students and grades. These reports contain the student's last name and first initial which occupy 16 print spaces. A heading line names the various grade types in use and requires 14 print spaces for each. It becomes apparent, then, that if more than four grade types are used for a given class then the student name together with those four grade types and the overall cumulative grade for the class, a "wrap around" situation will occur on the CRT and on printed output as well if an 80 column printer is being used. While there is no way to avoid this wraparound situation on an 80 column screen, it can be

continued on page 192

```
TABLE OF VARIABLES

<$TRING$> All variables beginning with A, B, C are DEFSTR
<INTEGERS> All variables beginning with X, Y, Z are DEFINT
<SINGLE PRECISION> All variables beginning with S are DEFSGL

Variable  Array  Usage
--------  -----  ------------------------------------------------
A           N    "Y" and "N" answers from keyboard; used also
                   to construct FILENAME string (C9)
A1          Y    Array of class names
A2          Y    Array of grade type names
A3          N    Class number $ in GRADETYP.DAT file
A4          N    Status of records in file
A5          N    Status of records in file
A6          N    Weight of a grade type $ in GRADETYP.DAT file
A7          N    Grade type name $ in GRADETYP.DAT file
A8          N    Class name $ in CLASS.DAT file
A9          N    Number of grade types for a class $ in
                                              CLASS.DAT file
A0          N    Student name comparison string for sort
B           N    String for top border of menu
B1          N    String for side border of menu
B2          N    Used to construct filename$ for changing
                                          CLASSn.DAT file names
B3          N    Class name $ used in re-writing files
B4          N    Number of grade types used in re-writing files
B5          N    Status of records in file being re-written
B6          N    Grade type name $ used in re-writing files
B7          N    Class # $ in file being re-written
B8          N    Weight of a grade type in file being re-written
B9          N    Student last name $ in file being re-written
B0          N    Student name comparison string for sort
C           N    Student first name $ in file being re-written
C1          N    Student first name
C2          N    Student last name
C3          N    Cumulative grade average $ in CLASSn.DAT file
C4          N    Data $ containing # of entries and grade
                   averages for all grade types in CLASSn.DAT file
C5          N    Same as C3 in file being re-written
C6          N    Same as C4 in file being re-written
C7          N    Student first name $ in CLASSn.DAT file
C8          N    Student last name $ in CLASSn.DAT file
C9          N    File name $
C0          N    Status of records in file being re-written
S           Y    Array of weights of grade types for a class
S1          Y    Array of accumulated points of grade types for
                                                  a student
S2          N    Comparison of overall cumulative average for
                                        sort (by grade ranking)
S3          N    A new grade being entered from keyboard
S4          N    Students cumulative (weighted) avg. for class
S5          N    Used in calculation of overall weights of
                                          gradetypes for a class
S0          N    Comparison of overall cumulative average for
                                        sort (by grade ranking)
X           N    Counter used in loops
X1          Y    Number of grade types used for each class
X2          Y    Number of entries made to each grade type for a
                                                  student
X3          N    Class number selected by user for activation
X4          N    Student number selected by user for activation
X5          N    Menu option choice
X6          N    Array to hold sort position of records (sort
                                                  procedure)
X7          N    The number of classes which exists
X8          N    The number of records in certain files
X9          N    Number of bytes per record for CLASSn.DAT file
X0          N    The number of a record being compared in the
                                                  sort routine
Y0          N    The number of a record being compared in the
                                                  sort routine
Y           N    Counter used in loops
Y1          N    Count of lines which have been printed
Y2          N    Output grading session to printer? 0=No; 1=Yes
Z           N    Counter used in loops
```


DEALERS - RETAILERS - VARS

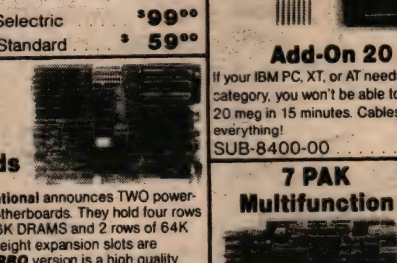
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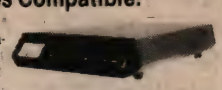
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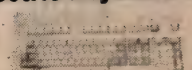
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```
                    MAIN  MENU

   1. Enter specifications for a class file
   2. Review specifications of all class files
   3. Change weighting of grades for a class
   4. Delete a class file
   5. Sort and list a class file
   6. Enter students to a class file
   7. Remove student from a class file
   8. Enter grades to a class file
   9. Revise grades in a class file
  10. Empty all grades from a class file
  11. List students in a class
  12. List students in a class with their grades
  13. FINISHED

          Enter number of operation to perform...
```

```
10 REM       >>>>> Teachers' Gradebook Program <<<<<
   Copyright (C) 1985 by Frank Dutton, Houston, TX 77063
20 REM
30 REM All LOCATE statements in this program have LINE then
   COLUMN coordinates. For some computers it may be necessary
   to reverse these coordinates.
40 REM LOCATE statements are in lines numbered: 95, 160,
   520-670, 1060, 1190, 1220, 1520, 1540, 3090, 4070, 4080
50 REM
60 REM Diskette overhead for program: for file 'CLASS.DAT'
   28 bytes per class.
70 REM For 'GRADETYP.DAT' 19 bytes per each grade type.
   For 'CLASSn.DAT' files 29 bytes + 6 additional per grade
   type per student.  Using 7 classes and 4 grade types per
   class and 35 students per class
80 REM the total amount of diskette space needed would be
   about 14Kb.  The programming occupies about another 16-20Kb
   depending whether it is in ASCII.  There should be at least
   another 2Kb for temporary sort files.
90 REM
95 CLS: LOCATE 12,30: PRINT "TEACHER'S  GRADEBOOK":FOR X=1
   TO 3000:NEXT X
100 REM >>>>> Program Begins Here <<<<<
110 CLEAR: DEFINT X,Y,Z: DEFSTR A,B,C: DEFSNG S:
   OPTION BASE 1: DIM A1(1): DIM X1(1): DIM A2(1): DIM S(1):
   DIM X2(1): DIM S1(1): DIM X6(1)
120 B=STRING$(79,"¥"):B1="¥"+SPACE$(77)+"¥"
150 GOSUB 500: ON X5 GOTO 1000,1500,2000,2500,3000,4000,
   4500,5000,5500,6000,6500,7000,160
160 CLS: LOCATE 12,36: PRINT "FINISHED": END
170 REM >>>>> Program Ends Here <<<<<
500 REM >>>>> Main Menu <<<<<
510 CLS: PRINT B: FOR X=1 TO 19: PRINT B1: NEXT X: PRINT B
520 LOCATE 3,35: PRINT "MAIN  MENU";: LOCATE 5,4
530 PRINT " 1. Enter specifications for a class file";:
   LOCATE 6,4
540 PRINT " 2. Review specifications of all class files";:
   LOCATE 7,4
550 PRINT " 3. Change weighting of grades for a class";:
   LOCATE 8,4
560 PRINT " 4. Delete a class file";: LOCATE 9,4
570 PRINT " 5. Sort and list a class file";: LOCATE 10,4
580 PRINT " 6. Enter students to a class file";: LOCATE 11,4
590 PRINT " 7. Remove student from a class file";:
   LOCATE 12,4
600 PRINT " 8. Enter grades to a class file";: LOCATE 13,4
610 PRINT " 9. Revise grades in a class file";: LOCATE 14,4
620 PRINT "10. Empty all grades from a class file";:
   LOCATE 15,4
630 PRINT "11. List students in a class";: LOCATE 16,4
640 PRINT "12. List students in a class with their grades";:
   LOCATE 17,4
650 PRINT "13. FINISHED";: LOCATE 19,20
660 INPUT "Enter number of operation to perform... ",X5:
   LOCATE 21,1
670 IF ((X5<1) OR (X5>13)) THEN LOCATE 19,20: GOTO 660
680 RETURN
1000 REM >>>>> Get Class Names <<<<<

1010 CLS: GOSUB 10000: IF (X7<1) THEN PRINT: PRINT "There
   are no classes presently in file": PRINT
1020 PRINT: INPUT "Do you wish to add a class ?  (Y/N) ",A
1030 IF ((A="n"   ) OR (A="N")) THEN GOTO 1380
1040 IF ((A<>"Y") AND (A<>"y")) THEN GOTO 1020 ELSE PRINT
1050 PRINT "Name of class # ";X7+1;
   " .....";
1060 GOSUB 11500: LOCATE CSRLIN,POS(Z)-26
1070 LINE INPUT " ",A1(X7+1): PRINT: PRINT
1080 IF LEN(A1(X7+1))>25 THEN A1(X7+1)=LEFT$(A1(X7+1),25)
1100 PRINT: PRINT: PRINT "You must now enter the number of
   different types of grades to be compiled for": PRINT "this
   class (e.g. Daily classroom participation, Chapter tests,
   Final exam)"
1110 INPUT ">>  # of grade types is: ",X1(X7+1):PRINT: PRINT
1130 PRINT "Now, please title each grade type and assign a
   'relative weight' to each.": PRINT "The relative weight of
   a grade type may be expressed in any numbers, but may"
1140 PRINT "be clearer if expressed as a percentage value of
   the whole grade (e.g. Class": PRINT "participation 30,
   Chapter tests 30, Final test 30, Extra work 10 = 100%)":
   PRINT: PRINT
1145 ERASE A2,S: DIM A2(X1(X7+1)): DIM S(X1(X7+1))
1150 PRINT "  #   Name of grade type          Weight"
1160 PRINT "--  ------------                  ------"
1170 FOR X=1 TO X1(X7+1)
1180 PRINT USING "##";X;: PRINT TAB(5);".............";
1190 LOCATE CSRLIN,POS(Z)-13
1200 LINE INPUT " ",A2(X)
1210 IF LEN(A2(X))>12 THEN A2(X)=LEFT$(A2(X),12)
1220 LOCATE CSRLIN-1,31
1230 INPUT " ",S(X)
1240 NEXT X
1250 X7=X7+1: X=X7: GOSUB 9000
1260 INPUT "Is this OK ?  (Y/N) ",A
1270 IF ((A="N") OR (A="n")) THEN X7=X7-1: GOTO 1100
1280 IF ((A<>"Y") AND (A<>"y")) THEN GOTO 1260
1300 FOR X=1 TO X1(X7)
1310 LSET A5="A": LSET A3=MKI$(X7): LSET A7=A2(X):
   LSET A6=MKS$(S(X))
1320 PUT #2,X8+X
1330 NEXT X
1340 LSET A4="A": LSET A8=A1(X7): LSET A9=MKI$(X1(X7))
1350 PUT #1,X7
1360 A=STR$(X7): A=RIGHT$(A,LEN(A)-1)
1370 OPEN "R",#3,"CLASS"+A+".DAT"
1380 CLOSE: GOTO 100
1500 REM >>>>> Review all class spec. files <<<<<
1510 GOSUB 7500: REM Get class names & # of grade types
1520 IF X7<1 THEN CLS: LOCATE 12,1: PRINT "NO CLASS RECORDS
   IN FILE": FOR X=1 TO 2500: NEXT X: CLOSE: GOTO 100
1530 GOSUB 12000
1540 IF X8<1 THEN CLS: LOCATE 12,1: PRINT "NO RECORDS IN
   SPECIFICATIONS FILE":FOR X=1 TO 2500:NEXT X:CLOSE:GOTO 100
1550 FOR X=1 TO X7
1560 GOSUB 13500: GOSUB 9000
1570 INPUT "Press <CR> to continue... ",A
1580 NEXT X: CLOSE: GOTO 100
2000 REM >>>>> Change weight specifications <<<<<
2010 GOSUB 10000: IF X7<1 THEN GOTO 1520 ELSE IF X8<1
   THEN GOTO 1540
2020 PRINT: INPUT "Enter number of class to change grade
   weights or '0' to cancel: ",X3
2030 IF X3<1 THEN CLOSE:GOTO 100 ELSE IF X3>X7 THEN GOTO 2020
2040 X=X3: GOSUB 13500: GOSUB 9000
2050 INPUT "Enter number of GRADE for which weight is to be
   changed or '0' to quit: ",X4
2060 IF ((X4<0) OR (X4>X1(X3))) THEN GOTO 2050
2070 IF X4=0 THEN CLOSE: GOTO 100
2080 FOR Z=1 TO X8: GET #2,Z
2090 IF (X=CVI(A3)) THEN IF (A2(X4)=A7) THEN Y=Z: Z=X8+1
2100 NEXT Z
2110 PRINT:PRINT:PRINT "CHANGE >> "; A2(X4); "  Weight -> ";
   S(X4)
2120 INPUT "Enter new weight... ",S(X4)
2130 LSET A6=MKS$(S(X4)): PUT #2,Y: GOTO 2040
2500 REM >>>>> Delete a class file <<<<<
2510 GOSUB 10000: IF X7<1 THEN GOTO 1520 ELSE IF X8<1
   THEN GOTO 1540
2520 PRINT: INPUT "Enter number of class to be deleted or
   '0' to cancel: ",X3
2530 IF X3<1 THEN CLOSE:GOTO 100 ELSE IF X3>X7 THEN GOTO 2520
2540 FOR X=1 TO X7
2550 IF X<X3 THEN GOTO 2590 ELSE IF X>X3 THEN GOTO 2570
2560 A=STR$(X3): A=RIGHT$(A,LEN(A)-1): KILL "CLASS"+A+".DAT":
   GOTO 2590
2570 A=STR$(X): A=RIGHT$(A,LEN(A)-1):
2580 B2=STR$(X-1): B2=RIGHT$(B2,LEN(B2)-1):
   NAME "CLASS"+A+".DAT" AS "CLASS"+B2+".DAT"
2590 NEXT X
2600 OPEN "R",#1, "TEMP.$$$",28
2610 FIELD #1, 1 AS C0, 25 AS B3, 2 AS B4
2620 FOR X=1 TO X7
2630 IF X=X3 THEN GOTO 2680 ELSE IF X>X3 THEN GOTO 2660
2640 LSET C0="A": LSET B3=A1(X): LSET B4=MKI$(X1(X))
2650 PUT #1,X: GOTO 2680
2660 LSET C0="A": LSET B3=A1(X): LSET B4=MKI$(X1(X))
2670 PUT #1,X-1
2680 NEXT X: CLOSE: KILL "CLASS.DAT":
   NAME "TEMP.$$$" AS "CLASS.DAT"
2690 OPEN "R", #1, "TEMP.$$$",19
2700 FIELD #1, 1 AS B5,2 AS B7, 12 AS B6, 4 AS B8
2710 GOSUB 12000
```

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avoided with most dot matrix printers so that the printed copy will be considerably more readable. Prior to starting the gradebook program enter the BASIC command to the printer to set a condensed print font which will allow more than the typical 80 columns across a page. It should also be noted that most versions of BASIC allow a default of only 80 characters to be sent to a printer without a carriage return and line feed; to defeat this use with "WIDTH" command to allow the maximum number of characters to the printer that will be consistent with the type font being used (e.g. with 17 c.p.i. condensed print use WIDTH "LPT1:",136). If four or fewer grade types are used for a class they will fit well within 80 columns; there is, however, no practical limited on the number of grade types which the program will accommodate.

As it is likely that many teachers will have the opportunity to keep up with their grades through this program on a computer system available at their school, the program and required files have been designed to use minimum disk space. It is recommended that a teacher have a single floppy diskette dedicated to this program and the associated files. The diskette should contain the computer operating system so the computer may be booted up using the diskette. A BASIC language command (or executable) file should also be on the diskette. With the addition of this program to the diskette, everything is complete and self contained for the keeping of the grade records for a teacher's classes. This program will generate and maintain all files which are necessary for its reference and data storage. Since the programming is designed to keep file space minimal there is no record of individual grade entries. All records are kept as raw averages for each grade type and the number of entries made for that grade type for each student and the calculated overall average based on the weights assigned to each grade type. All averages are kept current and are available immediately for all students through the menu function number 12. It is, of course, prudent to make and keep a current backup copy of the programming and data files in the event that an accident renders the working diskette unusable or makes it impossible to retrieve one or more data files.

The Teacher's Gradebook Program was written in GW-BASIC on a Zenith Z-150 IBM compatible. The author has

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Teacher's Computer
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found that programs written on this computer typically work on all MS-DOS versions so long as no graphics routines are included and this program contains no exotic or graphics routines. Having a desire to make the program as widely transportable as possible with very little modification the author also tried the program on a Sanyo MBC-1150 CP/M computer which also uses Microsoft BASIC. The BASIC used on the CP/M computer recognizes only the first two characters of a variable name and, therefore, the variables in this program have been set up to be non-ambiguous rather than descriptive of their content. The variables, then, should require no modification to run on any system. The program did require modifications to run on this particular CP/M machine and those modifications are listed below as it is believed they will be typical of modifications which may be necessary to run this program on some non-compatible computers.

LOCATE statements in this program are followed by the line position first and then the column position; for the CP/M computer on which the author tested the program it was necessary to reverse these positions so the column position would appear first followed by the line position. Additionally, the GW-BASIC the POS statement required a dummy argument following it [POS(Z)], but the BASIC on the CP/M did not. The LOCATE statements on the following lines may need positions reversed: 95, 160, 520-670, 1060, 1190, 1220, 1520, 1540, 3090, 4070, 4080. Following POS the (Z) argument as used in GW BASIC may need to be removed in lines 1060, 1190, 4070, 4080.

ERASE and DIMension statements are used liberally through the program to keep memory requirements minimal and specifically in line with the needs of the arrays which can vary considerably in size according to the number of classes and grade types which may be used by a given teacher. As written, some ERASE statements appear in loops and subroutines; this was not allowed on the CP/M computer and the following modifications were necessitated: Preceed "GOSUB 10000" or "GOSUB 7500" in lines 1010, 1501, 2010, 2510, 3010, 4010, 4510, 5010, 5510, 6010, 6510, 7010 with "ERASE A1,X1:". Preceed "GOSUB 8000", "GOSUB 11000" or "GOSUB 13500", in lines 1560, 2040, 2740, 3070, 3240, 3390, 4040, 4540, 5040, 5540, 6040, 6540, 7040 with

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Teachers Gradebook Program
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```
2720 FOR X= 1 TO X7
2730 IF X=X3 THEN GOTO 2820
2740 GOSUB 13500
2750 FOR Y=1 TO X1(X)
2760 IF X<X3 THEN GOTO 2790
2770 LSET B5="A": LSET B7=MKI$(X-1): LSET B6=A2(Y):
  LSET B8=MKS$(S(Y))
2780 PUT #1:GOTO 2810
2790 LSET B5="A": LSET B7=MKI$(X): LSET B6=A2(Y):
  LSET B8=MKS$(S(Y))
2800 PUT #1
2810 NEXT Y
2820 NEXT X: CLOSE
2830 KILL "GRADETYP.DAT": NAME "TEMP.$$$" AS "GRADETYP.DAT"
2840 GOTO 100
3000 REM >>>>> Sort and list a class file <<<<<
3010 GOSUB 10000: IF X7<1 THEN GOTO 1520 ELSE IF X8<1
  THEN GOTO 1540
3020 PRINT: INPUT "Sort which class number ?  (0=Cancel
  operation) ",X3
3030 IF X3>X7 THEN GOTO 3020 ELSE IF X3<1 THEN CLOSE:GOTO 100
3040 CLS: PRINT "SORT CLASS :": PRINT: PRINT "1.
  Alphabetically by Last name, First name": PRINT "2. By
  current grade ranking, highest to lowest": PRINT "3. CANCEL
  OPERATION": PRINT
3050 INPUT "Enter number of choice... ",X5
3060 IF X5<1 OR X5>3 THEN GOTO 3050
3070 GOSUB 8000: IF X8<1 THEN GOTO 11030: REM set up C9
3080 ERASE X6: DIM X6(X8)
3085 ERASE X2,S1: DIM X2(X1(X3)): DIM S1(X1(X3))
3090 CLS: LOCATE 12,36: PRINT "SORTING": ON X5 GOTO 3110,
  3270,3100
3100 CLOSE: GOTO 100
3110 REM >>>>> Sort by Last name, First name <<<<<
3120 A0="": B0="": X0=0: Y0=0
3130 FOR Y=1 TO X8
3140 FOR X=1 TO X8
3150 GOSUB 14000: IF A4<>"A" THEN GOTO 3170
3160 A0=C2+C1: X0=X: X=X8+1
3170 NEXT X
3180 FOR X=1 TO X8
3190 GOSUB 14000: IF A4<>"A" THEN GOTO 3220
3200 B0=C2+C1: Y0=X
3210 IF B0<A0 THEN A0=B0: X0=Y0
3220 NEXT X:
3230 X6(Y)=X0: X=X0: GOSUB 14000: LSET A4="S": GOSUB 14500
3240 NEXT Y: GOSUB 3500: GOSUB 12000: GOSUB 11000
3250 ERASE X2,S1: DIM X2(X1(X3)): DIM S1(X1(X3))
3260 GOTO 9500: REM Output class list
3270 REM >>>>> Sort by grade ranking <<<<<
3280 S0=0: S2=0: X0=0: Y0=0
3290 FOR Y=1 TO X8: FOR X=1 TO X8
3300 GOSUB 14000: IF A4<>"A" THEN GOTO 3320
3310 S0=S4: X0=X: X=X8+1
3320 NEXT X
3330 FOR X=1 TO X8
3340 GOSUB 14000: IF A4<>"A" THEN GOTO 3370
3350 S2=S4: Y0=X
3360 IF S2>S0 THEN S0=S2: X0=Y0
3370 NEXT X
3380 X6(Y)=X0: X=X0: GOSUB 14000: LSET A4="S": GOSUB 14500
3390 NEXT Y: GOSUB 3500: GOSUB 12000: GOSUB 11000:
3400 ERASE X2,S1: DIM X2(X1(X3)): DIM S1(X1(X3))
3410 GOTO 9500: REM Output class list
3500 REM >>>>> Write sorted file <<<<<
3510 CLOSE #1: CLOSE #2
3520 OPEN "R",#1,"TEMP.$$$",X9
3530 FIELD #1,1 AS C0,12 AS B9,12 AS C,4 AS C5,X9-29 AS C6
3540 FOR Y=1 TO X8
3550 X=X6(Y): GOSUB 14000: LSET C0="A":LSET B9=C2:LSET C=C1:
  LSET C5=C3: LSET C6=C4: PUT #1
3560 NEXT Y: CLOSE: KILL C9: NAME "TEMP.$$$" AS C9: RETURN
4000 REM >>>>> Enter students to a class file <<<<<
4010 GOSUB 10000: IF X7<1 THEN GOTO 1520 ELSE IF X8<1
  THEN GOTO 1540
4020 PRINT: INPUT "Enter student(s) to which class number ?
  (0=Cancel operation) ",X3
4030 IF X3>X7 THEN GOTO 4020 ELSE IF X3<1 THEN CLOSE:GOTO 100
4040 GOSUB 8000: REM Set up C9
4050 ERASE X2,S1: DIM X2(X1(X3)): DIM S1(X1(X3))
4060 CLS:PRINT "Student # ";X8+1;" to add to class is:":PRINT
4070 PRINT "First Name: ____________";: LOCATE CSRLIN,
  POS(Z)-13: LINE INPUT " ",C1
4080 PRINT " Last Name: ____________";: LOCATE CSRLIN,
  POS(Z)-13: LINE INPUT " ",C2
4090 IF LEN(C1)>12 THEN C1=LEFT$(C1,12)
4100 IF LEN(C2)>12 THEN C2=LEFT$(C2,12)
4110 PRINT "ADDING >> ";C2;", ";C1;" to class.  OK? ";:
  INPUT "(Y/N) ",A
4120 IF ((A="N") OR (A="n")) THEN GOTO 4060 ELSE IF ((A<>"Y")
  AND (A<>"y")) THEN GOTO 4110
4130 X8=X8+1: X=X8: LSET A4="A": GOSUB 14500
4140 PRINT: PRINT: INPUT "Enter another student ?  (Y/N) ",A
4150 IF ((A="N") OR (A="n")) THEN CLOSE: GOTO 100
4160 IF ((A<>"Y") AND (A<>"y")) THEN GOTO 4140 ELSE GOTO 4060
4500 REM >>>>> Remove student from file <<<<<
4510 GOSUB 10000: IF X7<1 THEN GOTO 1520 ELSE IF X8<1
  THEN GOTO 1540
4520 PRINT: INPUT "Remove student from which class number ?
  (0=Cancel operation) ",X3
4530 IF X3>X7 THEN GOTO 4520 ELSE IF X3<1 THEN CLOSE:GOTO 100
4540 GOSUB 8000: IF X8<1 THEN GOTO 11030: REM set up C9
4550 ERASE X2,S1: DIM X2(X1(X3)): DIM S1(X1(X3))
4560 GOSUB 10500: PRINT
4570 INPUT "Enter number of student to remove:  (or 0 to
  cancel operation) ",X4
4580 IF X4=0 THEN CLOSE:GOTO 100 ELSE IF X4>X8 THEN GOTO 4570
4590 OPEN "R",#1,"TEMP.$$$",X9
4600 FIELD #1, 1 AS C0,12 AS B9,12 AS C,4 AS C3, X9-29 AS C4
4610 FOR X=1 TO X8
4620 IF X=X4 THEN GOTO 4660
4630 GOSUB 14000
4640 LSET C0="A":LSET B9=C2:LSET C=C1:LSET C5=C3:LSET C6=C4
4650 PUT #1
4660 NEXT X
4670 CLOSE: KILL C9: NAME "TEMP.$$$" AS C9: GOTO 100
5000 REM >>>>> Enter grades <<<<<
5010 GOSUB 10000: IF X7<1 THEN GOTO 1520 ELSE IF X8<1
  THEN GOTO 1540
5020 PRINT: INPUT "Enter grades to which class number ?
  (0=Cancel operation) ",X3
5030 IF X3>X7 THEN GOTO 5020 ELSE IF X3<1 THEN CLOSE:GOTO 100
5040 GOSUB 8000: IF X8<1 THEN GOTO 11030: REM set up C9
5050 ERASE X2,S1: DIM X2(X1(X3)): DIM S1(X1(X3))
5055 Y2=0: GOSUB 15000: REM Output session to printer?
5060 CLS: PRINT TAB(15);"Enter appropriate grades as each
  student is listed":PRINT ">> Lowest possible grade is .001;
  a '0' or <CR> is not counted as a grade": PRINT
5070 FOR X=1 TO X8
5080 GOSUB 14000
5090 PRINT: PRINT: PRINT C2;", ";C1
5095 IF Y2>0 THEN LPRINT C2;", ";LEFT$(C1,1);". ";
5100 FOR Z=1 TO X1(X3)
5110 PRINT A2(Z);"  (Present avg.:";:
5120 IF X2(Z)>0 THEN PRINT (S1(Z)/X2(Z));
5130 INPUT "      Add new grade: ",S3
5135 IF Y2>0 THEN LPRINT S3; TAB(17+(Z%14));
5140 IF S3>0 THEN X2(Z)=X2(Z)+1: S1(Z)=S1(Z)+S3
5150 NEXT Z:
5155 IF Y2>0 THEN LPRINT
5160 PRINT"Cumulative Avg. before additions: ";S4;"    Now: ";
5170 GOSUB 8500: PRINT S4
5180 INPUT "All entries OK for this student? (Y/N) ",A
5190 IF ((A="N") OR (A="n")) THEN GOTO 5080 ELSE IF ((A<>"Y")
  AND (A<>"y")) THEN GOTO 5180
5200 LSET A4="A": GOSUB 14500: NEXT X
5205 IF Y2>0 THEN LPRINT CHR$(12)
5210 CLOSE: GOTO 100
```

continued on page 194

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XAT by XOR System Cabinet



Put your AT compatible motherboard in this good-looking **XAT** system cabinet. Key-lock On-Off switching with front panel access to three half-height peripherals. Behind the panel mounting for one or two hard disks. Color/Finish: Grey beige enamel. Dimensions: 6.25" x 21" x 16"

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Choose a 135 watt or a 150 watt power linear power supply with side-mount On-Off switch and quiet DC cooling fan. 115/230 VAC, 50/60 Hz.

135 Watt POW-1040-00 ..... $89.00 150 watt POW-1044-00 ..... $115.00

XTjr. by XOR System Cabinet

The **XTjr.** cabinet is only 3" x 16.5" x 15" yet it will hold a standard XT compatible motherboard. A special extender card BOA-5068-00 is used in the 5th slot to allow up to four add-on boards mounted horizontally in the cabinet. Two additional cut-outs are supplied for serial I/O. The cabinet price includes a switching power supply. Front panel cut-out for a half-height floppy or hard disk. AC switch and AC outlet for monitor on the rear panel.

CAB-5068-00 w/P.S. $135.00

XTC by XOR System Cabinet

The **XTC** cabinet is perfect for industrial and in an enginnering environment. Hinged door panels on both sides (removeable) allow easy access to components within. Also, a perfect system cabinet for the system integrator wanting to get away from the standard PC look. Front mount AC switch, cut-outs for three half-height peripherals and mounting behind the panel for a full-height hard disk or 1 or 2 half-height hard disks. Will accept mounting of the **XT**, **XTURBO**, and **XBC** motherboards 8-slot rear panel with two additional cutouts for serial I/O.

CAB-7068-00 assembled $99.00

Matching power supply; the switching power supply is a 135 watt unit that mounts in the top rear of the **XTC** cabinet for added cooling capability. Includes four DC power connectors for peripherals. 110/220 VAC, 50/60 Hz.

POW-1045-00 ..... $95.00

Add-On External Cabinet

The right choice for an external add-on cabinet! This is a miniature replica of the IBM style cabinet with heavy guage steel, top and bottom. Has completely formed front bezel with vents. Add-on a floppy, tape back-up, or up to 33 meg of hard disk (half-height). The rear panel has a universal AC input outlet, AC switch, and an automatic 110/220 VAC 50/60 Hz switch for easy configuration. Four cut-outs for ribbon cables are also provided. Switching power supply is included with cabinet and comes pre-installed and tested. Color: Grey beige, DC outputs: +5v @ 5.0 amps, +12v @ 1.5 amps.

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The one you've been waiting for! Floppy/Tape or dual Floppy, or Hard Disk/Tape, whatever combination you choose. Self-contained power supply with two DC connectors provided. Universal AC input, AC rear switch, and cut-outs for any combination of ribbon cables. Sturdy metal case painted in standard matching colors: Grey beige. 3.0" x 15.5" x 10.3"

CAB-6040-00 assembled $135.00

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Teachers Gradebook Program continued from page 193

```
5500 REM >>>>> Revise grades <<<<<
5510 GOSUB 10000: IF X7<1 THEN GOTO 1520 ELSE IF X8<1
  THEN GOTO 1540
5520 PRINT: INPUT "Revise grades for which class number ?
  (0=Cancel operation) ",X3
5530 IF X3>X7 THEN GOTO 5520 ELSE IF X3<1 THEN CLOSE:GOTO 100
5540 GOSUB 8000: IF X8<1 THEN GOTO 11030: REM set up C9
5550 ERASE X2,S1: DIM X2(X1(X3)): DIM S1(X1(X3))
5560 CLS: PRINT ">>>>> NOTE:  This operation REMOVES grades
  ONLY.  To fully revise a grade it": PRINT "must first be
  removed with this operation and then entered as a new grade"
5570 PRINT "      using the 'ENTER GRADES' operation.  In many
  cases, it will be simpler to": PRINT "leave an existing
  incorrect grade and add (or subtract) an appropriate"
5580 PRINT "amount from the next grade of that type which is
  entered to balance out": INPUT "      the average.    >>
  Continue with this operation? (Y/N) ",A
5590 IF ((A="N") OR (A="n")) THEN CLOSE: GOTO 140 ELSE IF
  ((A<>"Y") AND (A<>"y")) THEN GOTO 5560
5600 GOSUB 10500: PRINT
5610 INPUT "Enter number of student for grade revision:
  (or 0 to cancel operation) ",X4
5620 IF X4=0 THEN CLOSE:GOTO 100 ELSE IF X4>X8 THEN GOTO 5610
5630 X=X4: GOSUB 14000
5640 PRINT: PRINT: PRINT C2;", ";C1
5650 FOR Z=1 TO X1(X3)
5660 PRINT A2(Z);"  (Present avg.:";:
5670 IF X2(Z)>0 THEN PRINT (S1(Z)/X2(Z));
5680 INPUT "      Delete grade: ",S3
5690 IF S3>0 THEN X2(Z)=X2(Z)-1: S1(Z)=S1(Z)-S3
5700 NEXT Z:
5710 PRINT "Cumulative Avg. before revisions: ";S4;"  Now: ";
5720 GOSUB 8500: PRINT S4
5730 INPUT "All entries OK for this student? (Y/N) ",A
5740 IF ((A="N") OR (A="n")) THEN GOTO 5630 ELSE IF ((A<>"Y")
  AND (A<>"y")) THEN GOTO 5730
5750 LSET A4="A": GOSUB 14500
5760 GOTO 5600
6000 REM >>>>> Empty grades <<<<<
6010 GOSUB 10000: IF X7<1 THEN GOTO 1520 ELSE IF X8<1
  THEN GOTO 1540
6020 PRINT: INPUT "Empty grades for which class number ?
  (0=Cancel operation) ",X3
6030 IF X3>X7 THEN GOTO 6020 ELSE IF X3<1 THEN CLOSE:GOTO 100
6040 GOSUB 8000: IF X8<1 THEN GOTO 11030: REM set up C9
6050 ERASE X2,S1: DIM X2(X1(X3)): DIM S1(X1(X3))
6060 FOR X=1 TO X8
6070 GOSUB 14000: LSET A4="A": FOR Z=1 TO X1(X3): X2(Z)=0:
  S1(Z)=0: NEXT Z: S4=0: GOSUB 14500
6080 NEXT X: CLOSE: GOTO 100
6500 REM >>>>> List students in class <<<<<
6510 GOSUB 10000: IF X7<1 THEN GOTO 1520 ELSE IF X8<1
  THEN GOTO 1540
6520 INPUT "List students for which class ?  (0=Cancel
  operation) ",X3
6530 IF X3>X7 THEN GOTO 6520 ELSE IF X3<1 THEN CLOSE:GOTO 100
6540 GOSUB 8000: IF X8<1 THEN GOTO 11030: REM set up C9
6545 ERASE X2,S1: DIM X2(X1(X3)): DIM S1(X1(X3))
6550 GOSUB 10500: CLOSE: GOTO 100
7000 REM >>>>> List students & grades <<<<<
7010 GOSUB 10000: IF X7<1 THEN GOTO 1520 ELSE IF X8<1
  THEN GOTO 1540
7020 PRINT: INPUT "List students & grades from which class ?
  (0=Cancel operation) ",X3
7030 IF X3>X7 THEN GOTO 7020 ELSE IF X3<1 THEN CLOSE:GOTO 100
7040 A=STR$(X3): A=RIGHT$(A,LEN(A)-1): C9="CLASS"+A+".DAT":
  GOSUB 11000: IF X8<1 THEN GOTO 11030
7050 ERASE X2,S1: DIM X2(X1(X3)): DIM S1(X1(X3))
7060 GOTO 9500: REM Output student names
7500 REM >>>>> Get class names and grade types <<<<<
7510 GOSUB 11500: REM open CLASS.DAT file
7520 ERASE A1,X1: DIM A1(X7+1): DIM X1(X7+1)
7530 IF (X7)0) THEN GOSUB 13000: REM Read CLASS.DAT file
7540 CLOSE #1: RETURN
8000 REM >>>>> Set up C9 <<<<<
8010 A=STR$(X3): A=RIGHT$(A,LEN(A)-1): C9="CLASS"+A+".DAT":
  GOSUB 11000: RETURN
8500 REM >>>>> Compute S4 (Cumulative average) <<<<<
8510 S5=0!: FOR Z=1 TO X1(X3): IF X2(Z)>0 THEN S5=S5+S(Z)
8515 NEXT Z
8520 S4=0!: IF NOT (S5>0) THEN GOTO 8570
8530 FOR Z=1 TO X1(X3)
8540 IF X2(Z)<1 THEN GOTO 8560
8550 S4=S4+((S1(Z)/X2(Z))*(S(Z)/S5))
8560 NEXT Z: RETURN
8570 RETURN
9000 REM >>>> Display Class name, Grade types, Weights <<<<<
9010 CLS: PRINT ">> CLASS NAME: ";A1(X): PRINT: PRINT
9020 PRINT " #  Grade type                    Weight"
9030 PRINT "--  ------------                  ------"
9040 FOR Y=1 TO X1(X)
9050 PRINT USING "##";Y;: PRINT "  ";A2(Y); TAB(35);S(Y)
9060 NEXT Y: PRINT: RETURN
9500 REM >>>>> List out sorted file <<<<<
9510 CLS: PRINT ">>>>> STUDENT FILE  <<<<<": PRINT: PRINT
9520 PRINT "1.  List student file to CRT"
9530 PRINT "2.  List student file to PRINTER"
9540 PRINT "3.  FINISHED"
9550 PRINT: INPUT "Enter choice... ",X5
9560 IF ((X5<1) OR (X5>4)) THEN GOTO 9550
9570 IF X5=3 THEN CLOSE:GOTO 100 ELSE IF X5=2 THEN GOTO 9680
9580 REM >>>>> Output to CRT <<<<<
9590 Y1=0: FOR X=1 TO X8
9600 GOSUB 14000
9610 IF (Y1 MOD 18=0) THEN CLS:PRINT "Name                ";
9620 IF (Y1 MOD 18=0) THEN FOR Y=1 TO X1(X3): PRINT A2(Y);
  "  ";: NEXT Y: PRINT "Overall": PRINT
9630 Y1=Y1+1: PRINT C2;", ";LEFT$(C1,1);"  ";:
9640 FOR Y=1 TO X1(X3): IF X2(Y)>0 THEN PRINT S1(Y)/X2(Y);
  ELSE PRINT S1(Y);
9650 PRINT TAB(17+(Y%14));: NEXT Y: PRINT S4
9660 IF (Y1 MOD 18=0) THEN PRINT: INPUT "Press <CR> to
  continue...",A
9670 NEXT X: PRINT: INPUT "Press <CR> when finished... ",A:
  GOTO 9510
9680 REM >>>>> Output to printer <<<<<
9690 Y1=0: FOR X=1 TO X8
9700 GOSUB 14000
9710 IF (Y1 MOD 60=0) THEN LPRINT "Name                ";
9720 IF (Y1 MOD 60=0) THEN FOR Y=1 TO X1(X3): LPRINT A2(Y);
  "  ";: NEXT Y: LPRINT "Overall": LPRINT
9730 Y1=Y1+1: LPRINT C2;", ";LEFT$(C1,1);"  ";:
9740 FOR Y=1 TO X1(X3): IF X2(Y)>0 THEN LPRINT S1(Y)/X2(Y);
  ELSE LPRINT S1(Y);
9750 LPRINT TAB(17+(Y%14));: NEXT Y: LPRINT S4
9760 IF (Y1 MOD 60=0) THEN LPRINT CHR$(12)
9770 NEXT X: LPRINT CHR$(12): GOTO 9510
10000 REM >>>>> Select a class <<<<<
10020 GOSUB 7500: GOSUB 12000: IF X8<1 THEN GOTO 10080
10030 CLS: PRINT "Class #    Class Name"
10040 PRINT "-------  ------------------------"
10050 FOR X=1 TO X7
10060 PRINT USING "####";X;: PRINT TAB(12);A1(X)
10070 NEXT X
10080 RETURN
10500 REM >>>>> List students in class <<<<<
10510 LINES=2: CLS: PRINT TAB(32);"STUDENTS IN CLASS":PRINT
10520 FOR X=1 TO X8 STEP 2
10530 GOSUB 14000: PRINT USING "##";X;: PRINT "  ";C2;", ";
  C1;TAB(40);: X=X+1:IF X<=X8 THEN GOSUB 14000: PRINT USING
  "##";X;: PRINT "  ";C2;", ";C1: X=X-1 ELSE PRINT:PRINT
10540 LINES=LINES+1: IF LINES>=18 THEN PRINT: INPUT "Press
  <CR> to continue...",A: PRINT: PRINT: LINES=2
10550 NEXT X: PRINT: INPUT "Press <CR> when finished... ",A:
  RETURN
11000 REM >>>>> Get class specs, open data file <<<<<
11010 X=X3: GOSUB 13500: CLOSE
11020 GOSUB 12500: RETURN
11030 CLS:LOCATE 12,1: PRINT "NO STUDENTS IN FILE": FOR X=1
  TO 2500: NEXT X: CLOSE: GOTO 100
11500 REM >>> Open 'CLASS.DAT' file / check for records <<<
11510 OPEN "R",#1,"CLASS.DAT",28
11520 FIELD #1, 1 AS A4,25 AS A8, 2 AS A9
11530 X7=LOF(1): X7=X7\27
11540 IF X7>0 THEN GOTO 11560
11550 RETURN
11560 REM Verify length of file in valid records
11570 Y=X7: FOR X=1 TO X7
11580 GET #1,X
11590 IF A4<>"A" THEN Y=X-1: X=X7
11600 NEXT X: X7=Y: GOTO 11550
12000 REM >> Open 'GRADETYP.DAT' file / Check for records <<
12010 OPEN "R",#2,"GRADETYP.DAT",19
12020 FIELD #2, 1 AS A5,2 AS A3, 12 AS A7, 4 AS A6
12030 X8=LOF(2): X8=X8\19
12040 IF X8>0 THEN GOTO 12060
12050 RETURN
12060 REM Verify length of file in valid records
12070 Y=X8: FOR X=1 TO X8
12080 GET #2,X
12090 IF A5<>"A" THEN Y=X-1: X=X8
12100 NEXT X: X8=Y: GOTO 12050
12500 REM >>> Open "CLASSn.DAT" file / check for records <<<
12510 X9=X1(X3)*6: X9=X9+29
12520 OPEN "R", #3, C9,X9
12530 FIELD #3,1 AS A4,12 AS C8,12 AS C7,4 AS C3,X9-29 AS C4
12570 X8=LOF(3)\X9
12580 IF X8>0 THEN GOTO 12600
12590 RETURN
12600 Y=0: FOR Z=1 TO X8
12610 GET #3,Z: IF A4="A" THEN Y=Y+1
12620 NEXT Z: X8=Y: GOTO 12590
13000 REM >>>>> Read 'CLASS.DAT file' <<<<<
13010 FOR X=1 TO X7
13020 GET #1,X: A1(X)=A8: X1(X)=CVI(A9): IF EOF(1) THEN X=Z
13030 NEXT X: RETURN
13500 REM >>>>> Read 'GRADETYP.DAT' file <<<<<
13510 ERASE A2,S: DIM A2(X1(X)): DIM S(X1(X))
13520 Y=1: FOR Z=1 TO X8
13530 GET #2,Z
13540 IF X<>CVI(A3) THEN GOTO 13570
13550 CLASS%=CVI(A3): A2(Y)=A7: S(Y)=CVS(A6): Y=Y+1
13560 IF Y>X1(X) THEN Z=X8
13570 NEXT Z: RETURN
14000 REM >>>>> Read 'CLASSn.DAT' file <<<<<
14010 GET #3,X
14020 C2=C8: C1=C7: S4=CVS(C3)
14030 FOR Z=1 TO X1(X3)
14040 X2(Z)=CVI(MID$(C4,(((Z-1)*6)+1),2)):
  S1(Z)=CVS(MID$(C4,(((Z-1)*6)+3),4))
14050 S1(Z)=S1(Z)*X2(Z)
14060 NEXT Z:RETURN
14500 REM >>>>> Write to 'CLASSn.DAT' file <<<<<
14510 LSET C8=C2: LSET C7=C1: LSET C3=MKS$(S4)
14520 CONV$="": FOR Z=1 TO X1(X3)
14530 IF X2(Z)>0 THEN S1(Z)=  2)/X2(Z) ELSE S1(Z)=0
14540 CONV$=CONV$+MKI$(X2(Z))+MKS$(S1(Z))
14550 NEXT Z: LSET C4=CONV$: PUT #3,X: RETURN
15000 REM >>>>> Output grading session to printer? <<<<<
15010 CLS: INPUT "Shall the grades entered this session  be
  printed out for record? (Y/N) ",A
15020  IF  ((A="N")  OR (A="n")) THEN  GOTO  15070  ELSE  IF
  ((A<>"Y") AND (A<>"y")) THEN GOTO 15010
15030 Y2=1: PRINT: PRINT: INPUT "Press <CR> when printer  is
  ready... ",A
15040  LPRINT  "GRADE  ENTRIES  FOR  CLASS:  :";  A1(X3);  "
       DATE: __________": LPRINT
15050 LPRINT "Name                ";
15060 FOR Y=1 TO X1(X3): LPRINT A2(Y);"  ";: NEXT Y: LPRINT:
  LPRINT
15070 RETURN
```


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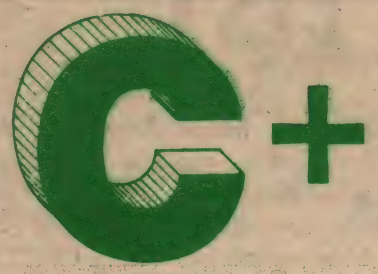
Teacher's Computer continued from page 193

"ERASE A2,S:". In line 7520 delete "ERASE A1,X1:" and in line 13510 delete "ERASE A2,S:". To get the ERASE statement out of a loop (as it was not allowed in a loop) LINE 1550 was changed to be "X = 1" and line 1570 was amended to read "INPUT "Press <CR> to continue...",A: X = X + 1". LINE 1580 was changed to read "IF X< = X7 THEN GOTO 1560 ELSE CLOSE: GOTO 100". LINE 2720 was also changed to read "X = 1" and LINE 2820 to "X = X + 1: IF X< = X7 THEN GOTO 2730" and LINE 2825 was added, reading "CLOSE".

The CLEAR statements also worked differently; the GW-BASIC CLEAR clearing all variables including DIMensioned arrays while the CP/M CLEAR only set all variables to zero or null strings. To work around this, LINE 110 was copied to LINE 99 and the "CLEAR:" statement removed from LINE 99 then LINE 110 was deleted and replaced by "110 CLEAR".

To determine the number of active records in file in lines 11530, 12030, 13570 it was necessary to change calculations as the CP/M LOF function returned the number of active 128 byte records (rather than the number of bytes in the file as with GW-BASIC). The correction should appear as "__line#__ Xn = LOF(B): Xn = Xn*128: Xn = Xn/nn" where "B" equals the buffer number associated with the file (1, 2, 3 respectively) and "n" equals the number following "X" (7, 8, 8 respectively) and "nn" equals the number of bytes per record (28, 19, X9 respectively).

For those readers who may not wish to manually key in this program, the author will make it available on DSDD, 5.25" floppy diskettes saved in ASCII so it may be read by any computer. Please send $10.00 to cover the cost of diskette, postage and handling to Frank Dutton, 8990 Richmond Avenue #1504, Houston, TX 77063 for a diskette. Please also specify if you wish the GW—BASIC version as it appears in the accompanying program listing or a version already modified as described above for CP/M. Diskettes may be requested in MS/PC-DOS format or in a number of popular CP/M formats. If a CP/M format is desired please specify the format and alternate formats as a given format may not be available to the author. If no specifications are sent, the programming will be furnished as listed in this article in MS/PC-DOS format. Although the author has tested and run this programming, it is, of course, entirely possible that bugs may still remain undiscovered within it. ●



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- Data Types: char, short, int, unsigned, long, float, double
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- Typedef, Struct, Union, Bit Fields, Enumerations
- Structure Assignment, Passing/Returning Structures

Functions

abs	conbuf	feof	getcseg	isascii	movmem	replace	strcat
asm	conc	ferror	getdseg	iscntrl	open	repmem	strcmp
asmx	cos	fflush	getd	isdigit	outp	rewind	strcpy
atan	cpystr	fgets	putd	islower	peek	right$	strlen
atof	creat	fileno	getdate	isprint	perror	rindex	strncat
atoi	cursblk	filetrap	gettime	ispunct	poke	rmdir	strncmp
atol	curslin	find	geti	isspace	poscurs	scanf	strncpy
bdos	curscol	floor	puti	isupper	pow	setbuf	strsave
bdosx	cursrow	fopen	getkey	itoa	printf	setbufsiz	system
bios	cursoff	fprintf	getmode	keypress	putc	setcolor	tolower
biosx	curson	fputs	setmode	left$	putchar	setdate	toupper
calloc	delete	fread	gets	len	puts	settime	ungetc
ceil	drand	free	getw	log	putw	setjmp	ungetch
cfree	exec	freopen	heapsiz	log10	rand	setmem	unlink
chain	execl	fscanf	heaptrap	longjmp	read	sin	write
character	execv	fseek	hypot	lseek	readattr	sound	writechs
chdir	exit	ftell	index	malloc	reach	sprintf	xmembeg
chmod	exitmsg	fwrite	inp	alloc	writech	sqrt	xmemend
clearerr	exp	getc	insert	mathtrap	readdot	srand	xmemget
close	fabs	getch	iofilter	mid$	writedot	sscanf	xmemput
clrscrn	fclose	putch	isalnum	mkdir	realloc	stacksiz	xmovmem
cmpstr	fdopen	getchar	isalpha	modf	rename	str$	_exit

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SOFTWARE SHOPPING LIST

NAME: ADEPT
TYPE: "Programmer's toolkit" for Medicalis and Dentalis software programs
COMPUTER: 8-bit CP/M, 16-bit CP/M or DOS (MS/DOS or PC/DOS)
DESCRIPTION: Contains over 20 machine language and relocatable object functions that a client can include in his own custom programs. Functions allow client to write programs that access the Medicalis/Dentalis database. Routines include opening, closing, searching, and scanning all Medicalis/Dentalis multi-keyed B-Tree files. Allows the dealer to make custom programs for a Medicalis/Dentalis user.
PUBLISHER: Articulate Publications, Inc., 402 North Larchmont Blvd., Los Angeles, CA 90004, (213) 871-1350
COST: $500.00

NAME: VBSI ACCOUNTING SERIES
TYPE: Accounting Series
COMPUTER: IBM and Macintosh
DESCRIPTION: Two parts of the series, Accounts Payable with General Ledger and Accounts Receivable with or without Inventory Control, are a complete solution for small business accounting. Accounts Payable/General Ledger works in conjunction with VBSI Retail point of purchase programs and Wholesaler Program. Some features: unlimited chart of accounts with up to 10 digit account numbers, check writing, and bank reconciliation from five banks, detailed information on-line for a year, automatic double entries, balance sheets and trial balance reports, aged payables, cash requirements reports, budget variance reports, as well as profit and loss reports, constant updating of general ledger. The Accounts Receivable program invoices, tracks customer balances, and if used with the inventory program, automatically updates the inventory files, ages receivables, and produces customer statements. Has a custom report generator for customer and inventory records, with inventory turnover on a daily, weekly, monthly, and yearly basis. Free support from company for the first year.
PUBLISHER: Vertical Business Software, Inc., 662 Main Street, New Rochelle, NY 10801, (914) 632-8305
COST: Accounts Payable and General Ledger, $450.00; Accounts Receivable and Inventory Control programs, seperately, $300.00, together, $450.00; Complete Accounting Series, $750.00, with Inventory Control, $900.00

NAME: THE TUSSMAN PROGRAM
TYPE: Billing/accounting software program for Attorneys
COMPUTER: CP/M and MS-DOS systems, including the IBM PC and compatibles
DESCRIPTION: Distinguished by its simplicity, completeness, and price. Features calendaring, trust accounting, general ledger, and extensive reporting capabilities. Backed by an 800-number user support line. Requires a minimum of installation and training time.
PUBLISHER: Tussman Programs, Inc., 2275 Shattuck Avenue, Berkeley, CA 94704, (800) 228-6589 (CA), (415) 845-1548 (outside CA)
COST: $695.00

NAME: CLAIMCARE
TYPE: Insurance Claim Data Entry Software Freeware
COMPUTER: IBM PC, XT, AT, or compatible
DESCRIPTION: Enables the user to create HCFA-1500 standard claim forms to send in the mail, or send claims over the telephone to the insurance carriers with the addition of insurance carrier modules. Insurance carrier modules are available from ECCI or can be created by the user with any program that manipulates data files (such as Dbase II or III, Lotus 1-2-3, Wordstar, BASIC, etc.) Enables user to enter insurance claims at the rate of about 25 per hour. Each claim is verified for errors before transmitted or printed. Each module approved according to carrier's standards. Disk includes Data Entry System, a disk tutorial, and information on using ECCI's bulletin board.

Users may obtain ClaimCare in the following ways: 1) Ask electronic claims coordinator at Blue Cross, Blue Shield, Medicare, or Medicaid. 2) Download ClaimCare free of charge from electronic bulletin boards throughout the country. 3) Download ClaimCare free from ECCI's bulletin board at (503) 683-3598. 4) Order the software, and register by sending $50.00 to ECCI. 5) Get a copy of ClaimCare from a friend.
PUBLISHER: Electronic Claims Clearinghouse, Inc., PO Box 11735, 1530 Willamette Street, Eugene, OR 97440-3735, (503) 683-4990
COST: Free

NAME: LETTERFALL
TYPE: Typing progam
COMPUTER: IBM PC and compatibles or PCjr
DESCRIPTION: Features clear directions; beginner, intermediate, and advanced options; 16 levels; notification of improvement. Not copy protected, "shareware."
PUBLISHER: Frank Harris, PO Box 69457, Station K, Vancouver, B.C., Canada V5K 4W6
COST: $25.00; $10.00 for Letterfall Sampler

NAME: THE BARON ABSTRACTOR
TYPE: A record management tool
COMPUTER: IBM PC and compatibles
DESCRIPTION: The Baron Abstractor is part of BaronData's comprehensive medical records system which integrates, processes, and reports hospital patient information as required by medical record departments. It simplifies the task of clinical data collection and offers versatility for varied health care settings. Flexible screen formats and displays allow the medical records department the ability to create an abstract. The Baron Ad-Hoc Report Writer, also part of the Baron System, supplements the custom capability of the Abstractor through selective report processing. The Abstractor and Ad-Hoc Report Writer, together with the Baron Encoder, Grouper, and Editor, provide a comprehensive system for traditional and non-traditional medical record functions.
PUBLISHER: BaronData Systems, 1700 Marina Boulevard, San Laendro, CA 94577, (415) 352-8101
COST: Not provided

NAME: THE MEMBERSHIP MANAGER
TYPE: Software for non-profit organizations
COMPUTER: Most MS-DOS and CP/M-86 microcomputers including IBM-PC/XT and AT, DEC Rainbow, Wang PC, TI and NEC-APC III
DESCRIPTION: Combines data base, accounting, and word processing functions to assist with membership development programs. Has ability to track 99 membership levels or types, to allow for multiple membership purchases by a member, to generate up to four different renewal notices on a flexible basis and to sort/select members by over 100 criteria for word processing purposes. Accounting features include flexible billings, aging reports, receivables reports, and a daily financial journal. Will support cash, accrual, or fund accounting methods. A variety of management reports are available. Integrating with other TARGET/1 software, different types of fundraising and special events activities can be supported at same time. Will interface with many popular word processors. Is menu driven and incorporates over 400 screens and prompts.
PUBLISHER: GT National, 400 Center Street, PO Box 3008, Auburn, ME 04210, (207) 786-0195
COST: Under $1,500.00

NAME: DESIGN YOUR OWN HOME
TYPE: Personal design software
COMPUTER: IBM PC and PCxt
DESCRIPTION: Includes architectural, interior, and landscape design in a format that lets you add furnishings or a landscape to your dream house plan. Shapes and designs can be moved around on the screen. Plans can be displayed in full color, saved on a disk, and printed for future reference. Explore color schemes for rooms and furniture, use multi-colored patterns for wallpaper or fabric design. Large library of professionally drawn trees, furniture, and other objects in top and side view is included. Compatible with most graphics packages.
PUBLISHER: Avant-Garde, 37B Commercial Blvd., Novato, CA 94947, (415) 883-8083
COST: $99.95

NAME: ZIP
TYPE: Pre-spread sheet business tool
COMPUTER: Commodore 64, 128
DESCRIPTION: Can be used by every manager who has operational, project, or planning responsibilities. Using ZIP, the manager can identify the "best" mix of objectives/projects that can be accomplished with the available or attainable resources, ask "what if" questions and determine their effect on the "best" mix of projects, create a business plan, select the "best" alternative for each activity or resource, upgrade an objective to project status, track project costs, manage resource costs, create over 30 reports for each project, and perform other miracles which will allow the manager to walk on water.
PUBLISHER: Lawco Ltd., PO Box 2009, Manteca, CA 95336, (209) 239-6006
COST: Entire pkg., $99.95 plus $10.00 s&h; documentation only, $29.95 plus $10.00 s&h; software disks only, $79.95 plus $5.00 s&h

NAME: PENPAL
TYPE: Integrated applications software package
COMPUTER: 64K disk based CoCo
DESCRIPTION: All five components (word processing, spread sheet, database management, graphing, and telecommunications) are accessed from a central menu. The spreadsheet and word processor can communicate with each other and pass data and files between both programs. May also graph spreadsheet data directly using the graphing package. The telecommunications component works on any file produced by any of the four other functions. The number keys on your CoCo become function keys, and a functions menu is constantly shown on the bottom of the screen. Select the right function and push the key.
PUBLISHER: Spectrum Projects, Inc., PO Box 21272, Woodhaven, NY 11421
COST: Introductory price, $69.95

NAME: RAM TREK 1V
TYPE: A Model 4 disassembler
COMPUTER: TRS-80 Model IV
DESCRIPTION: Explores and charts the Inner Memory of RAM or disk. Once in command, you are able to disassemble pertinent areas of Memory into Symbolic, Hex, or ASCII codes in the safety of a windowing environment. RAM Trek IV permits you to switch modes of operation and to stack up to 20 windows (each containing one of the three modes with different address locations) without the loss of data. Menu driven. Operations Manual is built in, can be displayed whenever needed.
PUBLISHER: En Fleur Corp, 2494 Sun Valley Circle Silver Spring, MD 20906, (301) 598-4532
COST: $39.95, plus $2.25 P&H

NAME: PASTEBOARD
TYPE: Graphics
COMPUTER: CP/M machines
DESCRIPTION: For CP/M machines (56k) system minimum) that have no special graphics capabilities. Requires an Epson (RX) or Gemini compatible dot-matrix printer. Complex figures can be constructed by generating simple figures (circles, ellipses, squares, etc.) and then adding them, cutting one with another, or intersecting the figures. An 80 column full screen graphics editor is also included to modify or create more complicated figures. Seven different size letters are available which can be included in the graphics figure, and the figure can easily be included in an ASCII text or Wordstar illustrations or decorative art using existing hardware.

PUBLISHER: MBD Software, 207 Dorcas Court, Mt. Laurel, NJ 08054, (609) 235-9244
COST: $59.95, plus $2.50 shipping and handling

NAME: CAR BUILDER
TYPE: Scientific simulation program
COMPUTER: Apple
DESCRIPTION: Lets you design, construct, modify, and test your own cars. You may first design the mechanical insides of the car, selecting chasis length, fuel tank, fear ratios, tires, etc. You may design and modify the body of the car, add decorative and functional touches, and run the car through a full testing procedure, including a wind tunnel and a test track. You can save your car to the disk.
PUBLISHER: Optimum Resource, Inc., Station Place, Norfolk, CT 06058, (203) 542-5553
COST: Not provided

NAME: MM/ENTR
TYPE: Mailmerge entry program
COMPUTER: CP/M, MS-DOS, and IBM-PC
DESCRIPTION: Lets you enter MailMerge data field by field without having to be concerned about commas, double quotes, and blank fields. When last field is entered, user has option of writing the record or going back and correcting any of the previous fields in the current record. Record is written just as it would be if the non-document mode of WordStar has been used and each record entered individually. Will handle up to 30 fields per record. Can be used to create any kind of an ASCII sequential data file.
PUBLISHER: Elliam Associates, 24000 Bessemer Street, Woodland Hills, CA 91367, (818) 348-4278
COST: $19.95 plus $2.00 shipping and handling

NAME: TAXWORKS
TYPE: Income tax program
COMPUTER: CP/M, PC-DOS, and MS-DOS
DESCRIPTION: To enter, calculate, and print Federal Income Tax Form 1040 and supporting schedules. The Professional Taxworks program is aimed at tax professionals preparing between 100 and 1000 tax returns per year. A smaller, less expensive Individual Taxworks program is for the person wishing to do his own return. Free telephone support. Menu driven, requires minimal operator training. Questions on screen match lines on actual tax forms. Program performs calculations and prints out completed return.
PUBLISHER: Hollingsworth Business Services, 881 Alma Real Drive, Suite T-2, Pacific Palisades, CA 90272, (213) 459-2746, (800) 232-1040
COST: The Professional, $500.00; the Individual, $100.00

NAME: GEOGRAF, Version 3.0
TYPE: A graphics software library
COMPUTER: IBM PC and compatibles
DESCRIPTION: Prepares high-quality customized graphs of any type from within your program. The same graphics commands produce graphs on the screen, dot matrix printer, and pen plotter. Aimed at technical professionals who use microcomputers. Available for Microsoft FORTRAN, IBM Professional FORTRAN, IBM Basic, and Summit Software BetterBasic.
PUBLISHER: Geocomp Corp., 342 Sudbury Road, Concord, Massachusetts 01742, (617) 369-8304
COST: $275.00

NAME: BASIC BUSINESS
TYPE: Complete accounting software
COMPUTER: MS-DOS and CP/M computers
DESCRIPTION: Package includes seven integrated accounting modules: General Ledger, Accounts Receivable, Accounts Payable, Payroll, Inventory Control, Sales Order Processing, and Purchase Order Processing. An optional Point-of-Purchase module is offered. Features include simple installation, double entry accounting method, complete integration between modules, full audit trails, extensive reporting in each module, and use of widely available business forms.
PUBLISHER: Advent Products, Inc., (714) 651-1907, MCI Mail 259-2802, TELEX: 6502592802 MCI
COST: $89.95

NAME: VERSION 4.0 for PC/PROFESSIONAL FINANCE PROGRAM II
TYPE: Enchancements for that program
COMPUTER: IBM PCs and compatibles
DESCRIPTION: Reconciliation of large transaction files is now faster. More specific information can be entered for the management and identifying purposes of entries. Printing capabilities are more flexible. A complete, powerful record keeping accounting system, PC/PFP II will keep 26 asset accounts for checkbooks, money market accounts, IRAs, and other assets, and 26 liability accounts for credit cards, loans, mortgages, and other liabilities.
PUBLISHER: Best Programs, 5134 Leesburg Pike, Alexandria, VA 22303, (800) 368-2405
COST: $245.00

NAME: UNIVERSE BASIC TRANSLATOR
TYPE: A structured basic with own text-editor with word-processing capability
COMPUTER: Any system which uses Microsoft Basic
DESCRIPTION: Lines are identified by labels as needed instead of numbers. Labels can be indented, and blank lines can be used. Subroutines can pass parameters, including arrays. Local variables and labels can be used in subroutines. All features of Microsoft Basic can be used. Universe Basic is converted into Microsoft Basic and documented line-for-line. It can then be run by the Microsoft interpreter or compiler.
PUBLISHER: Donald Bassman and Associates, PO Box 12074, Seattle, WA 98102, (206) 322-5114
COST: $30.00

NAME: ZEUS
TYPE: Program generator (works with Borland International's Turbo Pascal)
COMPUTER: IBM PCs and compatibles
DESCRIPTION: Allows users to generate database programs, write reports, and build menus very quickly. A complete menu-driven database program can be generated with Add, Change, Inquire, Delete, and Backup functions in just a few minutes. The program requires only that the user draw the input screen layout, name the variables and their types, and tell Zeus to go to work. The program is then written in just a few seconds. A similar utility for writing complete reports. The menu-builder allows the user to input multiple programs to execute with a single keystroke. These other programs do not need to be written in Pascal.
PUBLISHER: JMC Research, Inc., 803 Eisenhower Drive, Augusta, GA 30904
COST: $59.95

NAME: TAXVISION TAX PLANNER
TYPE: Income tax planning aid
COMPUTER: Apple IIe and IBM PC and compatibles
DESCRIPTION: Complements TaxVision. Works with Microsoft's Multiplan spreadsheet program. And easy-to-use template system that represents United States Income Tax Form 1040. Up to three simultaneous independent scenarios can be entered; the user can enter a different value to investigate the effect of different assumptions on the final calculated tax.
PUBLISHER: Vision Information Products, Inc., 386 Mira Mar, Suite D, Long Beach, CA 90814, (213) 454-5454
COST: $19.00

Bulletin Board

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AMIS Allen. TX 214-727-2824 *24
AMIS Dallas. TX 214-680-9018
BBS-80 DALTRUG Dallas. TX 214-235-8784 *24
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COMPUTER RESET, Garland. TX 214-272-7920 8am-12am
METROPLEX CP/M INTEREST GROUP RBBS/RCP/M Plano. TX 214-867-2068 *24
MICROSERVE (TBBS), Tyler. TX 214-581-3722. 300/1200/2400 *24
NET-WORKS Apple Grove. Dallas. TX 214-644-5197
NET-WORKS Apple Shack. Dallas. TX 214-644-4781 *24
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NET-WORKS Winesap Dallas. TX 214-824-7455
RCP/M CBBS Dallas. TX 214-913-8274
T.R.A.I.N. BBS, Ennis. TX. Atari. 214-875-9818

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AMIS Pennsylvania 215-250-9471
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COMNET-80 North Wales. PA 215-855-3809
COMPCOM 215-968-0170 300/1200 *24
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HEMRES-80 Allentown. PA 215-434-3998
LEHIGH PRESS BB, PA 215-435-3388
RBBS Pennsylvania 215-398-3937
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TIBBS Reading. PA 215-929-5348

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ARCADIA BBS Akron. OH 216-644-1014
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ATARI EXPRESS Akron. OH 216-253-9247
ATARI PRISM Akron. OH 216-867-2422
BBS Computer Applications Poland. OH 216-757-3711
THE BLACK HOLE 64 Elyria. OH 216-322-7184 9pm to 6am
BIG BOARD (CP/M) Akron. OH 216-745-7819
BULLET-80 Chesterland. OH 216-729-2769
CAMELOT ATARI BBS Akron. OH 216-864-7002 *24
CLOUD NINE, 216-650-2989 *24
COMNET-80 Akron. OH 216-645-0827 *24
THE COMMODORE ARCADIA, 216-644-1014. 11pm-9am est.
COMMODORE'S BRIDGE Akron. OH 216-929-1454
COMMODORE CHIP Akron. OH 216-678-5033 *24
COMMODORE CLIPPER Akron. OH 216-928-4123 *24
COMMODORE COMMANDER Akron. OH 216-923-0347
THE COMMODORE CRUSADER, 216-864-8924 *24
COMMODORE EXPRESS Akron. OH 216-253-9247
THE COMMODORE GATEWAY, 216-896-9001 *24
COMMODORE RAINBOW Akron. OH 216-644-5516 *24
COMMODORE REALM Akron. OH 216-666-9463. 10pm-7am est.
THE COMPUTER EXPERIENCE, Cleveland. OH 216-946-9076 *24
COMPU-CENTER, Akron. OH 216-929-4803 *24
COMPUTER EXPERIENCE 216-946-9076 *24
COPLEY ATARI Akron. OH 216-666-8961
THE DARK TOWER Rogers. OH 216-227-3245 *24
FIRECOMM Akron. OH 216-666-0306
FIRESTONE PARK ATARI Akron. OH 216-724-7760
THE FOURTH DIMENSION, 216-644-4597 *24
FORUM-80 Cleveland. OH 216-486-4176
THE GOLDEN KEEP, 216-896-9147 *24
HENRIETTA OUTHOUSE
Oberlin. OH 216-965-8151 8pm-7am
MEGA-FORCE BBS Akron. OH 216-699-9055
NEW AGE BBS Cleveland. OH 216-451-3280
NIGHT STALKER Akron. OH 216-376-6443
PIRATES DELIGHT Akron. OH 216-672-7580 *24
PMS Massillon. OH 216-832-8392 *24
PMS RAUG Akron. OH 216-867-7463 *24
RAILNET BBS Cleveland. OH 216-883-6298 *24
RBBS Lorain. OH 216-282-3423
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S.T.A.R. BBS -3, Akron. OH 216-753-5379
TBBS of Akron 216-724-2125 *24
TBBS OF SOUTH SUMMIT Akron. OH 216-724-1963 *24
TBBS OF TALLMADGE Akron. OH 216-633-7483 *24
TIMEX BULLETIN SERVICE, Parma. OH 216-661-4105
UNDERGROUND 64 Lorain. OH 216-282-8848 8pm-7am days
VICCOMM Akron. OH 216-896-0775 *24
AMHERST Amherst. OH 216-988-8806

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NET-WORKS C.A.M.S. Decatur. IL 217-429-5541
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MEGA NET BBS Mishawaka. IN 219-259-4366
TIBBS-LAKE COMPUTER DEPOT Whiting. IN 219-659-1245 *24

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KRICKIT Dover. DE 302-734-0179. 10pm-7am
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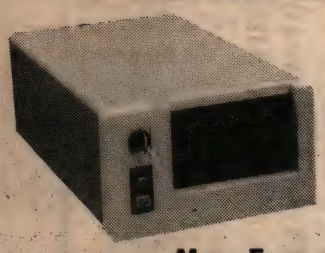
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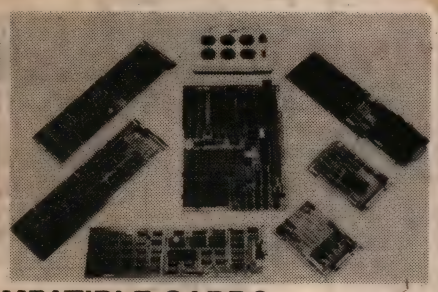
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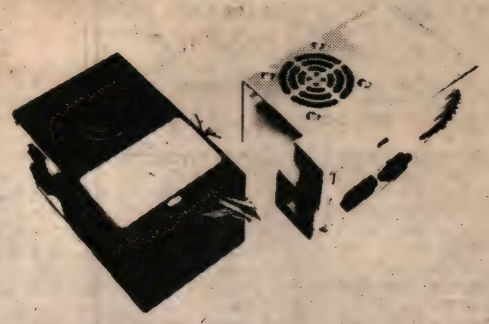
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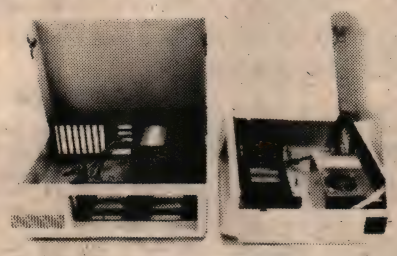
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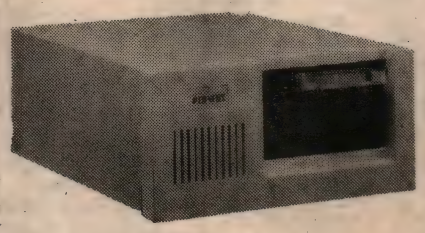
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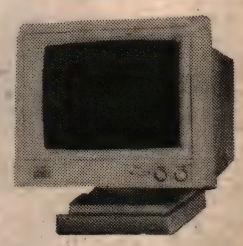
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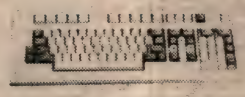
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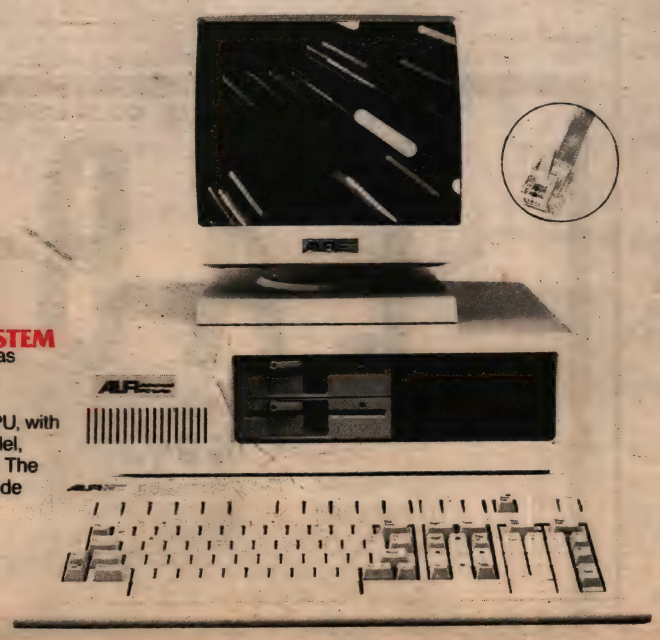
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TS 800 KIT & PARTS

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TS 803 KIT & PARTS

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Case (PS, all hardware, all cables, ½h DSDD Flop.) $275
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Case & PCB Combo & all docs. (includes telefast man.) $649

TS806 Complete + 10 Mb HD & Controller PCB $998

TS806 Complete + 20 Mb HD & Controller PCB $1247

TS800 Work Stations with above package ..... $499, 3/$1350

TS816 KIT & PARTS

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TS802 — TS802H UPGRADE KIT

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16 BIT — 8088 CPU

TS1602 - 256K/1mb 8088 CPU, 8087 (math processor), 8089 (I/O Processor), NEC 7220 (graphics controller), supports CP/M 86, 2 - DSDD 40T floppies & hard drive.

TS1603 - 128K/256K/1mb, 8088 CPU, Supports MS-DOS & CP/M 86, 2 - DSDD 80T floppies, hard drive & mouse.

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Same as TS802 except PCB is $300

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If you know of or have a trade show, swap meet or club meeting connected with the computer field, we'll run an announcement in the COMING EVENTS section FREE of charge.

NOVEMBER 1985

NOVEMBER 29-DECEMBER 1
FORTH MODIFICATION LABORATORY (FORML) conference, at the Asilomar conference grounds in Pacific Grove, CA. A forum for sharing and discussing new proposals to enhance the Forth computer language. Call the FIG HOT LINE (408) 277-0668

DECEMBER

DECEMBER 2-6
TUTORIALS FOR PROFESSIONAL DEVELOPMENT, Boston MA. For more information contact Gerry Segal, 11 West 42nd Street, New York, NY 10036 (212) 869-7440

DECEMBER 3-5
5TH ANNUAL VIDEODISC & OPTICAL DISK CONFERENCE, Chicago, IL. Call PC Expo for details, (201) 569-8542.

DECEMBER 5-8
THE WORLD OF COMMODORE III, at Toronto International Centre, 6900 Airport Rd., Mississauga (Toronto), Ontario. Will feature the Amiga, the PC 10/PC 20, and the C128. All Commodore-compatible systems and services will be displayed. Demonstrations in business, education, and home applications. 75,000 square feet; $4 adults, $3 students and seniors, $10 four day pass. Call Hunter Nichols Inc. (416) 439-4140.

DECEMBER 8
15th NJ MICRO SHOW AND FLEAMARKET - Holiday Edition. Aspen Manor/Hotel on Rte 46 in Parsippany, NJ. Over 300 vendors; 9 a.m. to 5 p.m.; $7 adults, $4 children 5-12; vendor spaces $25-$70 each. Call Ken Gordon Productions Inc. at (201) 297-2526 or (800) 631-0062.

DECEMBER 10-12
PC EXPO, Chicago, IL. Contact PC Expo, Inc., at (201) 569-8542.

DECEMBER 27-30
MODERN LANGUAGE ASSOCIATION CONVENTION, Chicago, IL. Call the MLA at (212) 741-5588.

1986
JANUARY

JANUARY 9-12
CES-WINTER, Las Vegas, NV, Convention Center. Call the Consumer Electronics Show at (312) 861-1040.

JANUARY 11
6TH PHILADELPHIA MICRO SHOW AND FLEAMARKET, at the George Washington Conference Center, Willow Grove, PA. Over 175 vendors; 10 a.m. to 5 p.m.; $5 adults, $3 children 5-12; vendor spaces $25-$70 each. Call Ken Gordon Productions Inc. at (201) 297-2526 or (800) 631-0062.

JANUARY 19
2ND EXPO/64 COMPUTER FLEAMARKET, at Meadowlands Hilton Hotel, Secaucus, NJ. Exclusively for owners of Commodore 64/128/20 (& Amiga) computer systems. Over 150 vendors; 10 a.m. to 5 p.m.; $7 adults, $4 children 5-12. Call Ken Gordon Productions Inc. at (201) 297-2526 or (800) 631-0062.

JANUARY 25
6th BOSTON MICRO SHOW AND FLEAMARKET, at the Northeast Trade Center, Woburn, MA. Over 200 vendors; 10 a.m. to 5 p.m.; $5 adults, $3 children 5-12; vendor spaces $25-$70 each. Call Ken Gordon Productions Inc. at (201) 297-2526 or (800) 631-0062.

FEBRUARY

MARCH

MARCH 3-6
FIRST INTERNATIONAL CONFERENCE ON CD ROM, at the Sheraton Hotel, Seattle, WA., discussing how CD ROM will affect traditional print-based publishing, business productivity software, business computer systems, and home and entertainment systems. Will incorporate invited presentations from leading and influential authorities and experts, key equipment suppliers, publishers, and experienced users. Cost for attending is $799 until February 1; the cost will then be $899. All papers should be submitted by January 6 to Min S. Yee, Conference Chairman, Microsoft Corporation, 10700 Northup Way, Box 97200, Bellevue, WA 98009.

MARCH 3-6, 1986
SECOND ANNUAL COMDEX IN JAPAN will be held in Tokyo. The Asian edition of the world's largest computer industry trade show will be held at the Harumi Exhibition Center. More than 200 leading companies from Japan, other Asian countries and the U.S. are expected to display and demonstrate new computer systems, peripherals, software, media, supplies, services, accessories and other related items. For further information contact The Interface Group, Inc., 300 First Avenue, Needham, Massachusetts, 02194, (617)449-6600.

MARCH 11-13, 1986
12th ANNUAL FEDERAL DP AND COMMUNICATIONS is to be held in Washington at the DC Convention Center. Geared to the special requirements of Federal data processing professionals. More than 200 leading manufacturers and suppliers are expected to display and demonstrate computer systems, data communications and communications equipment, office automation systems, software, timesharing, network services and related equipment. For further information contact The Interface Group, Inc., 300 First Avenue, Needham, Massachusetts 02194, (617)449-6600

MARCH 19-21
PERSONAL COMPUTER INTERFACING WORKSHOP for Scientific Instrument Automation, from Virginia Tech; held in Blacksburg, Va.; directed by Mr. David E. Larsen and Dr. Paul E. Field. $495. 3 days. Hands-on workshops with each participant wiring and testing interfaces on the IBM-PC and other personal computers. Call or write Dr. Linda Leffel, C.E.C., Virginia Tech, Blacksburg, VA 24061, (703) 961-4848.

MARCH 23-26, 1986
THE FIFTEENTH INTERNATIONAL TI-MIX CONFERENCE AND TRADE SHOW, "Achieving Your Potential" will be held at the Lowes Anatole Hotel in Dallas, Texas. It focuses on the powerful vehicle that TI-MIX provides for users: how to take full advantage of Texas Instruments computers and peripherals. For further information contact TI-MIX, M/S 2200 CC052, PO Box 2909, Austin, Texas 78769

MARCH 24-27, 1986
14th ANNUAL INTERFACE '86 Conference and Exposition will be held at the Georgia World Congress Center in Atlanta, GA. More than 300 companies are expected to display and demonstrate computer systems and communications services for large-scale corporate, government and institutional users. For further information contact The Interface Group, 300 First Avenue, Needham, Massachusetts 02194

APRIL

APRIL 1-3, 1986
THIRD ANNUAL COMDEX/WINTER
The winter edition of the world's largest computer industry trade show, will be held at the Los Angeles Convention Center. More than 200 leading companies are expected to display and demonstrate new computer systems, peripherals, software, media and supplies, services, accessories and other related items. For further information contact The Interface Group, Inc., 300 First Avenue, Needham, Massachusetts 02194, (617)449-6600

APRIL 28 - MAY 1, 1986
SIXTH ANNUAL COMDEX/SPRING will be held at the Georgia World Congress Center, Atlanta Apparel Mart and Atlanta Merchandise Mart in Atlanta, GA. The springtime edition of the world's largest computer industry trade show. More than 700 leading computer and related companies are expected to display and demonstrate new computer systems, peripherals, software, media, supplies, services, accessories and other related items. For further information contact The Interface Group, Inc., 300 First Avenue, Needham, Massachusetts 02194, (617)449-6600.

MAY

MAY 29-31
PERSONAL COMPUTER INTERFACING WORKSHOP for Scientific Instrument Automation, from Virginia Tech; held in Blacksburg, Va.; directed by Mr. David E. Larsen and Dr. Paul E. Field. $495. 3 days. Hands-on workshops with each participant wiring and testing interfaces on the IBM-PC and other personal computers. Call or write Dr. Linda Leffel, C.E.C., Virginia Tech, Blacksburg, VA 24061, (703) 961-4848.

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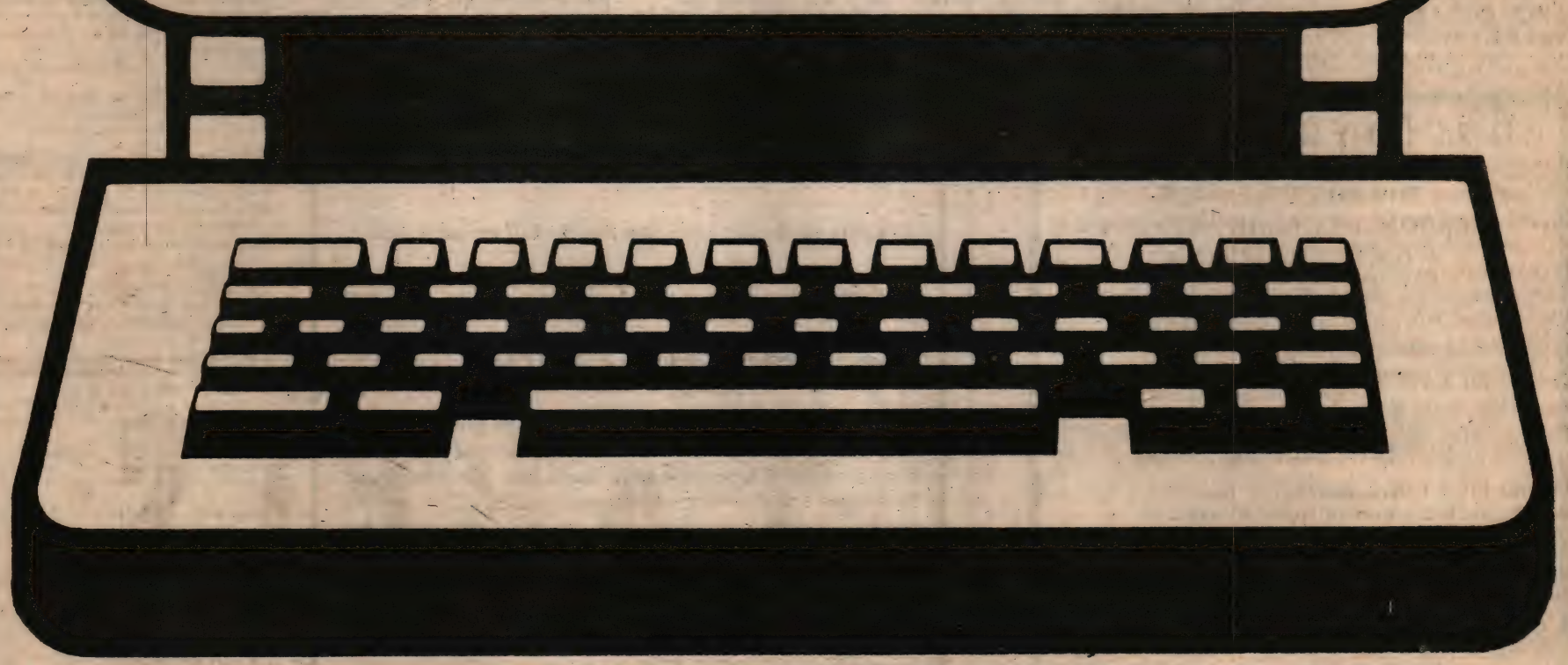
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January 19 Sunday 10:00 AM - 5:00 PM Adult $6/Child $4	**EXPO 64** for Commodore Computers! Show #2 Meadowlands Hilton Hotel - Secaucus, NJ Exit 16W of NJ Turnpike in Meadowlands Over 175 Vendor Tables
January 25 Saturday 10:00 AM - 5:00 PM Adult $6/Child $4	**BOSTON MICRO SHOW (#5)**-Winter Edition Northeast Trade Center - Woburn, Mass. Exit #39 Rte. 128 (I-95) Next to Zayres Over 250 Vendor Tables!
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ROLAND PLOTTERS CALL
SHARP PLOTTERS CALL
BLUE CHIP CALL
DIABLO CALL
EPSON CALL
JUKI CALL
QUADRAM CALL
BMC CALL
RITEMAN CALL
SWEET-P PLOTTER CALL
AMDEK CALL

Disk & Hard Drives

IOMEGA BERNOULLI CALL
TALLGRASS CALL
RANA CALL
CORVUS CALL
ALLOY COMPUTER PR CALL
TANDON CALL
MAYNARD CALL
SANYO CALL
TEAC CALL
GREAT LAKES CALL
IDE CALL
TEAM MATE CALL
TECMAR CALL
XCOMP CALL

Modems

ANCHOR AUTOMATION CALL
NOVATION CALL
HAYES CALL
PROMETHEUS CALL
HES CALL
KENSINGTON CALL
RIXON CALL
TRANSEND CALL
VEN-TEL CALL
INTERMATRIX, MAC PHONE CALL
UNIVERSAL DATA CALL

Plug-In Boards

AST RESEARCH CALL
CARDCO CALL
HERCULES CALL
ORANGE MICRO CALL
MICROTEK CALL
PERSONAL COMP. PR. CALL
SOUND IDEAS CALL
STB CALL
ORCHID CALL
QUADRAM CALL
PERSYST CALL
STANDARD DATA CALL
TECMAR CALL
MEMORY CHIPS CALL
ADVANCED LOGIC CALL
ATARI CALL
COMPUTER STATIONS CALL
DIGITAL RESEARCH CALL
MPC PERIPHERALS CALL
MICROMAX CALL
MICROSOFT CALL
PARADISE SYSTEMS CALL
PRACTICAL PERIPH CALL
TAXAN CALL
TITAN CALL
VIDEX CALL
DIGIGRAPHIC CALL

Sound Covers CALL

Furniture

Printer Stands

Monitor Stand Swivel

Leading Edge Products

Software

SHOEBOX CALL
PRINT SHOP (APPLE) CALL
XENOCOPY PLUS CALL
COPY II PLUS CALL
ORCA/M CALL
WORDPERFECT CALL
CHANG CALL
HAYES CALL
MICROPRO CALL
PEACHTREE CALL
SORCIM/IUS CALL
HOWARDSOFT CALL
BPI CALL
CDEX CALL
MICROSOFT CALL
MICRORIM CALL
MOUSESYSTEMS CALL
DIGITAL RESEARCH CALL
STONEWARE CALL
HESWARE CALL
PEACHTREE CALL
INFOCOM CALL
FOX & GELLER CALL

Surge Protectors

Brooks 4 Plug w/Cord 5 Year Warr 53.97
Brooks 6 Plug w/Cord 5 Year Warr 59.97
Isobar 2 Plug w/Cord 35.97
Isobar 4 Plug w/Cord 53.97
Powerguard 6 Plug Wall 17.97
Multiple Outlet 6 Plug w/Cord 11.97
Powermate Stopper 6 Plug w/Cord 35.97
Cord Reel 6 Plug, 25 Ft. Extension 20.97

Shredex Shredders

#2001—Watergate Crosscut Desktop
Slightly larger than a telephone with removable tray 269.00

#1000—Watergate Top Secret Crosscut
Up to 5 sheets may be fed simultaneously. Includes wastebasket 469.00

#350—Desktop Model
Comes complete with forms feed funnel. Excellent for computer forms 525.00

#2100—Watergate Crosscut
High capacity computer forms desktop shredder. Handles up to 8 sheets of paper in a single pass 979.00

Plug-In Boards

C-64 BATTERIES INCLUDED
BusCard II 139.97

CARDCO (Commodore)
Cardprint/B, printer interface 45.00

CARDCO
Card Board/5 55.97
Cardette 1 27.97
Card Key (Numeric Key Pad) 34.97
Card Print/G (Graphics) 69.97
Cardwriter (Light Pen) 27.97

HERCULES
Graphics Card 335.00
Color Card 165.00

ORANGE MICRO
Grappler +, graphics interface for Apple IIe 85.00
Serial 79.00
Grappler + (IDS), for IDS printers 99.00
Buffered Grappler +, for Apple, with 16K buffer and sockets to 64K 145.00
Orange Interface, Apple parallel card 60.00
Bufferboard 99.00
Bufferboard A 99.00
Bufferboard E 99.00
Grappler CD 89.00
16K Ram 25.00

MICROTEK
Apple parallel graphics card 65.00
Apple parallel graphics interface with 16K buffer 145.00
RV-611C Apple parallel card w/cable 49.50
BAM-16 Apple 16K Ram 69.00
Q-Disk 128K disk emulation 249.00
Magnum-80 Apple II+ 80 column 139.00
Magnum-80e Apple IIe 80 column 37.50
Magnum-80me Apple IIe 80 column w/64K 99.00
SV-622-C Serial interface 69.00
MT-SPC Cable for serial card 29.75

Printers

BROTHER PRINTERS LETTER QUALITY
HR-15XL, 17 CPS 355.00
HR-25, 23 CPS 615.00
HR-35, 36 CPS 850.00

BROTHER DOT MATRIX PRINTERS
2024L LQ/Graphics 24 PIN 895.00
M1009 Matrix 179.00
HR-5 Thermal Portable 165.00
CF-50 Cut Sheet Feeder HR-15 169.00
TF-50 Tractor Feed HR-15 99.00
KB-50 Keyboard for HR-15 139.00
CF-100 Sheet Feed HR-25/35 179.00
TF-100 Tractor Feed HR-25/35 109.00
SF-50 Cut Sheet Narrow 2024L 199.00
SF-200 Cut Sheet Wide 2024L 289.00

"NEW STAR PRINTERS"
SG-10 FT 245.00
SG-15 FT 395.00
SD-10 FT 359.00
SD-15 FT 475.00
SR-10 FT 515.00
SR-15 FT 615.00
SB-10 735.00
Power Type Daisy Wheel Printer 345.00
MACINTOSH SOFTWARE CALL

Computers

Columbia Portables 256K 1895.00
Columbia Desk Top 128K 1795.00
Corona Portable 256K 1795.00

Interface Cards

APPLE APRICORN
Apple Graphic Card 83.97
80 Column with 1K 62.97
80 Column with 64K 125.97
Serial Interface Card 69.97
16K Ram Card 69.97
64K Ram Upgrade 69.97

DIGITAL RESEARCH
CP/M Gold Card (196K) 416.50
CP/M Gold Card (64K) 245.00

JAGUAR
80 Column Board *(Apple II)* 118.97

IBM APRICORN
Parallel Interface Card 69.97
Serial Interface Card (Asynchronous Card) 69.97

Graphics

BAUDVILLE
Blazing Paddles *Apple* 34.97
Pixit *Apple* 34.97
Take 1 *Apple* 41.97

Joysticks/Mouse

KOALA
Gibson Light Pen *C-64* 66.50
KoalaPad *Apple* 82.50 *IBM* 82.50 *C-64* 77.00
KoalaPad w/Micro Illustration *Apple* 82.50 *C-64* 66.50
KoalaPad w/PC Design *IBM* 99.50

KRAFT
Apple Joystick 34.97
IBM Joystick 34.97

MICROSOFT
Mouse 136.50
Serial Mouse 136.50

MOUSE SYSTEMS
PC Mouse w/Software 136.50

TG
Apple Game Paddles 24.47
Apple II Joystick 31.47
Apple IIe Joystick 31.47
IBM Joystick 31.47
Select-A-Port (Apple) 27.97
Trackball (Apple) 27.97

VISICORP
VisiOn Mouse 177.50
PC Paint including Mouse 139.30

WICO
Apple Analog Joystick 34.97
The Boss (C-64/Atari) 12.57
C-64 Command Control Joystick 20.97
IBM Analog Joystick 34.97
3-Way Deluxe (C-64/Atari) 23.00

Maintenance Products

PERFECT DATA
5¼" Head Cleaning Kit 11.97
5¼" Micro Maintenance 27.97
5¼" Micro Maintenance Kit w/Case for Computer Care or 8" 39.97
Printwheel Cleaning 13.97
Type Element Ball Cleaning 13.97

Media

INNOVATIVE CONCEPTS FLIP-N-FILE
Data Case 5¼" Holds 50 Flip-N-File 9.98
Flip-N-File 5¼" Orig. 50 11.98
Flip-N-File 5¼" Holds 100 17.98
Flip-N-File 5¼" Lock 25 11.98
Flip-N-File 5¼" Lock 50 18.98
Flip-N-File 8" Holds 50 24.50
Flip-N-File 8" Holds 40 Drawer 15.50

JANUS (Lifetime Warrantee)
5¼" SS/SD-Ten Pack 12.98
5¼" SS/DD-Ten Pack 15.98
5¼" DS/DD-Ten Pack 18.98
8" SS/SD-Ten Pack 23.50
8" SS/DD-Ten Pack 27.50

MAXELL (Lifetime Warrantee)
Single-Side, Double-Density Ten Pack 5¼" 16.98
Double-Side, Double-Density Ten Pack 5¼" *Disk* 20.98
DEC RX50 Ten Pack 32.50
3½" Ten Pack 32.50
A T 5¼" Ten Pack 45.00

Modems

ANCHOR AUTOMATION
Volksmodem 59.00
6420 Modem 79.00
Volksmodem 12 199.00
Mark XII 229.00

HES
HES Modem I *C-64* 52.49
HES MODEM II 83.97

IDE
1200/300 Modem Card *IBM* 369.00

NOVATION
Access 1-2-3 *IBM* 429.00
Accoustic Cat 139.00
Apple Cat II 207.00
Apple Cat 212 429.00
CAT Comm System Ext. MS DOS 365.00
CAT Comm System Ext. CP/M 86 365.00
CAT Comm System Int. MS DOS 365.00
CAT Comm System Int. CP/M 86 365.00
J Cat 110.00
103 Smart Cat 185.00
212 Smart Cat 429.00

TRANSEND
PC Modem Card (1200 baud *IBM*) 356.85
Trans Modem 1200 435.00
Transpak I *Apple* 195.00
Transpak II *Apple* 213.85
Transpak III *Apple* 276.75
Transpak PC+ (1200 baud *IBM*) 428.35

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ZX81/TS1000 USERS, PO BOX 2411, VISTA, CA 92803

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TIPUEBLO, C/O STANLEY CLARK. PRES.. 809 E. 12TH. PUEBLO. CO 81001
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APPLE METROPOLIS, 7220 SW 131 AVE.. SUITE #133. MIAMI. FL 33183
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TAMPA BAY TRS-80 USERS GROUP, P.O. BOX 76001. ST. PETERSBURG. FL 33734
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TI 99/4A P.O. BOX 1119. DAVENPORT. FL 33837
TI PROGRAMMABLE CALCULATOR CLUB, TI PPC NOTES. P.O. BOX 1421. ARGO. FL 34294-1421
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HEATH UG OF NJ, C/O RALPH BRADBURN. 300 RT. 59. TALLMAN. NY 10982
HEATH UG OF NJ, (HUGNJ), C/O RALPH BRADBURN. 300 RT. 59. TALLMAN. NY 10982
IBM PC USERS GROUP, 290 CENTRAL AVENUE. SUITE 113. LAWRENCE. NY 11559 (516) 239-8885
INTERCALC, POB 254. SCARSDALE. NY 10583
JERI-HUG, 'THE HEATH UG'. C/O HEATHKIT ELECTRONICS. 15 JERICHO TURNPIKE. JERICHO. NY 11753
JINSAM UG, C/O JAMES P. ISCARO. PRES.. BOX 274. RIVERDALE. NY 10463
KAYPRO UG, POB 100. MALVERNE. NY 11565
KINGS BYTE NEWSLETTER, 1063 EAST 84TH STREET. BROOKLYN. NY 11236
LION, LONG ISLAND OSBORNE NETWORK. POB 190. OCEANSIDE. NY 11572
LIST (LON GISLAND SINCLAIR-TIMEX) GROUP, 10 IDLE DAY DRIVE. CENTERPORT. NY 11721
LNW UG, RT. 1 BOX 244. MILL RD.. YAPHANK. NY 11980
LONG ISLAND COMPUTER ASSOC., POB 71. HICKSVILLE. NY 11802
LONG ISLAND NEC UG, 75 WEAVING LN.. WANTAGH. NY 11793
MCKOWNVILLE IBM PC USERS GROUP, C/O EDWARD DE VARENNES. 27 NORWOOD STREET. ALBANY. NY 12203
METRO TRS-80 UG, C/O GEORGE MUEDEN. 310 WEST 106 STREET. 15D. NYC 10025
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THE EDUCATORS' USERS FORUM C/O PAM HALE. 50A SOUTH MAIN STREET. SPRING VALLEY. NY
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MOD 4 UG, 1578 E. 26 ST.. BROOKLYN. NY 11229
N.E.C.A., 11 DICKENS AVE.. DIX HILLS. NY 11746
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NEW YORK LAP USERS' GROUP c/o GEORGE MUEDEN. 310 WEST 106 ST 15D. NY. NY 10025. 212-222-8751
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NYU DISABLED STUDENT SERVICES, 566 LAGUARDIA PLACE. ROOM 701. NY. NY 10012
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NY SANYO USER GROUP, POB 182. TIMES PLAZA STATION. NY 11217
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SCHENECTADY HUG, C/O T. BUDGE. 75 SANDERS. ST.. SCOTIA. NY 12302. WALTER HIPPLE 385-5660
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SMUG TI UG, C/O RIGH CLEMENTS. DEPT. 444. COLESVILLE RD.. BINGHAMTON. NY 13902
SOUTHERN TIER APPLE USER'S GROUP, (S.T.A.U.G.). POB G. BREESPORT. NY 14816
STATEN ISLAND APPLE UG, POB 141. STATEN ISLAND. NY 10305
STUDENTS AND TEACHERS COMPUTER USERS GROUP c/o NICK DUDISH. GROS BLVD.. HERKIMER. NY 13350
SUFFOLK COUNTY COMPUTER ASSOCIATION, RT. 1. BOX 244. MILL RD. YAPAHANK. NY 11980
SYBIL'S M.U.G. UG, RT 52. CARMEL. NY 10512
SYRACUSE APPLE UG, POB 6586. SYRACUSE. NY 13217
SYRACUSE OSBORNE UG (SOUP), C/O MARTIN SHAPIRO. 601 CLAREDON ST.. SYRACUSE. NY 13201
T.I. 99ER UG, POB 544. Deer Park. NY 11729
TS USERS XII, Arthur A. Schaefer. 112 Wendel Ave.. Buffalo. NY 14223
THE BASIS GROUP INT'L, NY CHAPTER, C/O BILL BASCH. 127 MADISON AVE.. 2ND FLOOR. NYC 10016
THE DATAMERICA COMPUTER USER'S GROUP, 312 E. 84 ST. #1A. NYC 10028
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THE SYRACUSE APPLE UG, POB 6586. SYRACUSE. NY 13217
TRI-COUNTY NY, NY CROMENCO U.G., C/O CHARLES PERRELLA. 45F RT 303. VALLEY COTTAGE. NY 10989
TRS 80 USER GROUP, RT. 1. BOX 244. MILL RD.. YAPAHANK. NY 11980
TRS-80 UG OF CENTRAL NY, 2362 EAST LAKE ROAD. SKANEATELES. NY 13152
U.A.U.G., C/O UPSTATE COMPUTER SHOP. 99 COMMERCIAL DR. 5A. WHITESBORO. NY 13492
UPSTATE 99/4A UG, POB 13522. ALBANY. NY 12212
UPSTATE NY ATARI COMPUTER ENTHUSIASTS, C/O DALE WHITNEY. BOX 232 MORRIS BLVD.. CONKLIN. NY 13748
VAN RENSSELAER COMPUTER USER GROUP, ST. ANTHONY ONHUDSON. WASHINGTON AVE.. RENSSALAER. NY 12144
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WESTCHESTER PET USER GROUP, POB 1280. WHITE PLAINS. NY 10602
WESTERN NEW YORK ATARI USER'S GROUP, P.O. BOX 59. BUFFALO. NY 14216
MICROPRO USERS GROUP OF AMERICA, 140 RIVERSIDE DRIVE. NEW YORK. NY 10024
N.Y. ON-LINE COMMODORE USER GROUP, BOX 8255. JACKSON HEIGHTS. NY 11372
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MICRO COMPUTER USERS GROUP OF RALEIGH, 5225 N. BOULEVARD. RALEIGH. NC 27604
NATAHALA COMPUTER CLUB (99'ERS), RT. 3. BOX 64-E. ROBINSVILLE. NC 28771
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RALEIGH COLOR COMPUTER CLUB, PO BOX 681. GARNER. NX 27259 C/O DAVID ROPER
RALEIGH OSBORNE COMPUTER CLUB, PO BOX 53754. FAYETTEVILLE. NC 28305
TACC, POB 17523. RALEIGH. NC 27619
TACS, PO BOX 7073. GREENSBORO. NC 27417-0073
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WILMINGTON TRS-80 USERS GROUP, 1605 PRINCESS ST.. WILMINGTON. NC 28401
WILSON TRS-80 USERS' GROUP, PO BOX 336. LUCAMA. NC 27851
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GRAND FORKS IBM PC U.G., 717 IVES STREET. BUXTON. ND 58218
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APPLE-DAYTON USERS GROUP, POB 1666. FAIRBORN. OH 45324
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CENTRAL OHIO COMMODORE USERS GROUP, P.O. BOX 28229. COLUMBUS. OH 43228-0229
CENTRAL OHIO 99ers, 1456 GRANDVIEW AVE.. COLUMBUS. OH 43212
CIN-DAY TI USER GROUP, PO BOX 519. WESTCHESTER. OH 45069-0519
CINCINNATI COMP CLUB, 6515 KENVIEW DR.. CINCINNATI. OH 45243
CINCINNATI COMPUTER CLUB, †@@ CONVERSE DRIVE. CINCINNATI. OH 45240
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COKUG, CENTRAL OHIO KAYPRO USERS GROUP, C/O I. WEISS. 3775 DANUBE DRIVE. GROVE PORT. OH 43125
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COLUMBUS CP/M-ACSCO USERS, BOX 28606. COLUMBUS. OH 43228-0355
COLUMBUS MAX80 USERS, (M.A.X.U.G.). BOX 28606. COLUMBUS. OH 43228-0355
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COLUMBUS VIC-20 USERS GROUP, 169 N. VINE. WESTERVILLE. OH 43081. C/O LEN HOLLAND
COMMODORE USER GROUP, c/o JEFF EKLUND. 702 PARK AVE.. NW. NEW PHILADELPHIA. OHIO
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CUYAHOGA VALLEY COMPUTER CLUB, C/O BRIAN HEIN. 3053 ROHRER RD.. WADSWORTH. OH 44281
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IBMACSCO, C/O NEIL. BOX 16086. COLS. OH 43126**NEO LAKE ASHTABULA IBM PC UG**, POB 175. MADISON. OH 44057
LIMA AREA TI 99/4A USERS GROUP, 1513 WEST WAYNE STREET. LIMA. OH 45805
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THE OHIO VALLEY COMPUTER CLUB, 5A475 NORTH OVERLOOK DRIVE. WINTERSVILLE. OH 43952 (614) 264-6820
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TUG-DC, C/O GARY DITLLIO. 1109 MADISON AVE.. PROSPECT PARK. PA 19076
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MIDLANDS 80 COMPUTER CLUB, PO BOX 7594. COLUMBIA. SC 29202
NONAME APPLE CLUB, C/O JAMES SUMNER. CITADEL STATION. BOX 13. CHARLESTON. SC 29409-0901
PIEDMONT 99'ers USERS GROUP, PO BOX 5921. GREENVILLE. S.C. 29606
THE COMPUTERNIKS, C/O USC CC BOOK STORE. PO BOX 1954. CONWAY. SC 29526
SPARCUG, SPARTANBURG COMMODORE USERS GROUP. P.O. BOX 319. SPARTANBURG. SC 29304

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SIOUX FALLS AREA HUG, C/O LORIN DOBSON. 2001 S SPRING AVE.. SIOUX FALLS. SD 57105
SIOUXLAND 99ERS UG, 2310 S. COVELL. SIOUX FALLS. SD 57105

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CHATTANOOGA USERS GROUP (CHUG), PO BOX 136. HIXSON. N 37343. C/O EARL CONWAY
EAST TENNESSEE CENTRAL HEATH USERS GROUP, 7608 LUSCOMBE. KNOXVILLE. TN 37919. C/O WALTER SCOTT. 615 690-3864
ET 64 USERS GROUP, PO BOX 495. KNOXVILLE. TN 37901
HOLSTON VALLEY USERS GROUP, 310 WILLOW ST.. MT. CARMEL. TN 37642
K-TOWN 99/4A USERS GROUP, 3506 GARDEN DRIVE. KNOXVILLE. TN 37918. (615)687-8869
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MEMPHIS COMMODORE USERS CLUB, P.O. BOX 38095. BARTLETT. TN 38134-0095
MID-SOUTH 99 USERS GROUP, P.O. BOX 38522. GERMANTOWN. TN 38138-0522
MUSIC CITY 99'ER USERS GROUP, PO. BOX 4072. MADISON. TN 37116
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APPLE PI, C/O CALY FRANCELL. 2105 ANDREWS HWY.. ODESSA. TX 79761
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BIG COUNTRY HOME COMPUTER USER GROUP, PO BOX 2114. ABILENE. TEXAS 79604
CENTRAL TX COMPUTER, 14 LAVACA. AUSTIN. TX 78701
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CENTRAL TEXAS 99/4A USERS GROUP, PO BOX 3026. AUSTIN. TX 78764
CLEARWATER OSBORNE GROUP, C/O MAYNARD HUNTLEY. PO BOX 57613. WEBSTER. TX 77598
CLUB 1802, PO BOX 985. DICKINSON. TX 77539
COMMODORE (HOUSTON) USERS GROUP, C/O JOHN WALKER. EDITOR OF NEWSLETTER. 8738 WILDFOREST. HOUSTON. TX 77088
COMP HOBBYIST GROUP, UTA. ARLINGTON. TX 76109
COMPUGUILD TRS-80 GROUP, 2211 S. LIPSCOMB. AMARILLO. TX 79109
CORPUS CHRISTI COMPUTER CLUB, 801 ORLEANS. CORPUS CHRISTI. TX 78418
CORPUS CHRISTI TRS-80 USERS GROUP, 6214 HIDDEN COVE. CIRPUS CHRISTI. TX 78412
CORPUS CHHRISTI 99'ERS USERS GROUP, C/O LANCE PARR. 534 VAKY. CORPUS CHRISTI. TX 78404
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DALLAS TI HOME COMPUTER GROUP, C/O LOUIS GUION. 11923 QUINCY LANE. DALLAS. TX 75230
DALTRUG, TRS-80 USERS GROUP, INC., PO BOX 400472. DALLAS. TX 75240
DYNASTY SMART-ALEC USER'S GROUP, (S.M.U.G.). C/O RICHARD ZERWICK. 15033 KIMBERLY LANE. HOUSTON. TX 77079. SOURCE ID #TCW003
EAST TEXAS EAGLE USERS, 1809 BELL. LONGVIEW. TX 75602
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FORT WORTH APPLE USERS GROUP, BOX 13903. ARLINGTON. TX 76013 C/O GARTH CLOSE
GROUP BUY USERS, PO BOX 830119. RICHARDSON. TX 75083
GROUP 80, DAVIS HALL. ARLINGTON. TX 76109
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Dot Wire: 9 vertically-arranged wires

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Print Head Life: 100 million characters

Printing Characters: Character composition: Standard 11×9 dot matrix; NLQ 23×18 dot matrix; Character size: 2×2.42 mm (standard); Character set: Full ASCII character set (96), 32 special European characters

Image-Printing: Image data: Vertical 8,9 and/or 16 dot information; Resolution: Horizontal 240 dots/inch (quadruple-density)

Print Buffer: 2K-byte utility buffer
Interface: 8-bit parallel interface (Centronics type)

Paper: Paper type: plain paper; Single sheet: Max. width 431.8 mm (17″); Fanfold: Max. width 431.8 mm (17″); Multipart paper: Max. 3 sheets (original+2)

Ink Ribbon: Type: Cartridge type continuous ink ribbon; Canon-specified; Color: black; Ribbon life: 3 million characters/cartridge

Physical Dimensions: Size: 598 mm (W)×350 mm (L)×130 mm (H) (23½″×13⅘″×5⅛″); Weight: (26.4 lbs)

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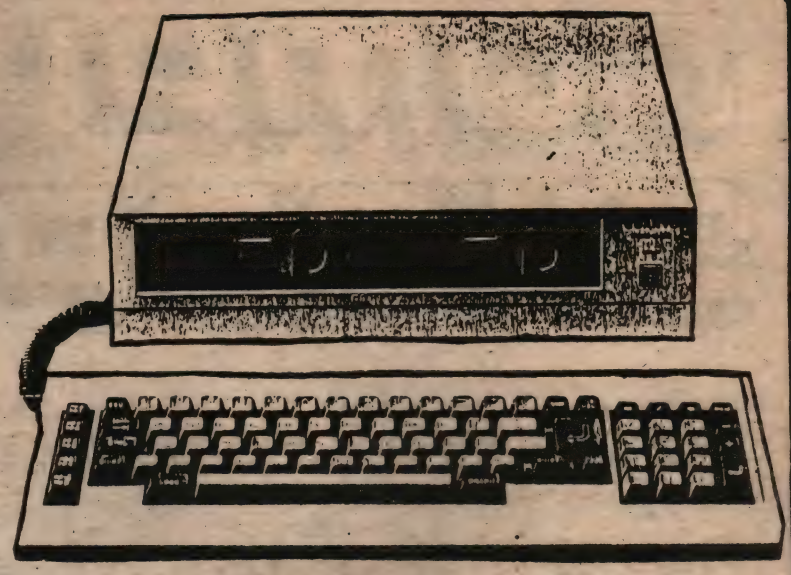


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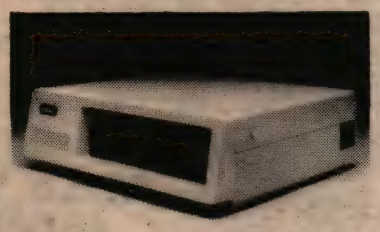
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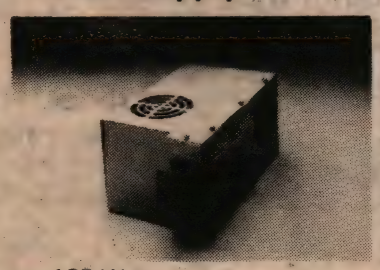
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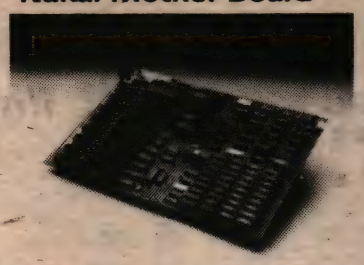
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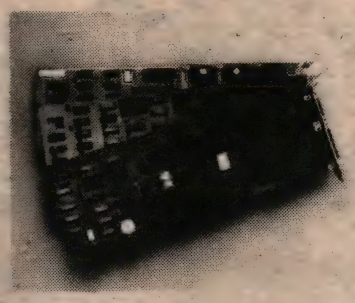


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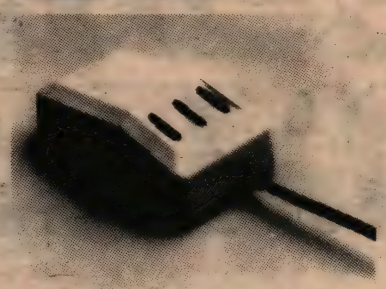
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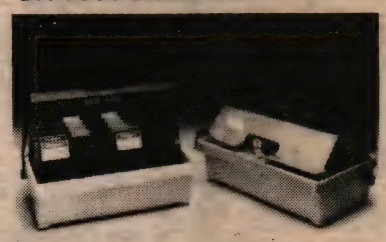
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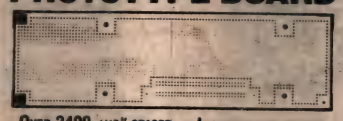
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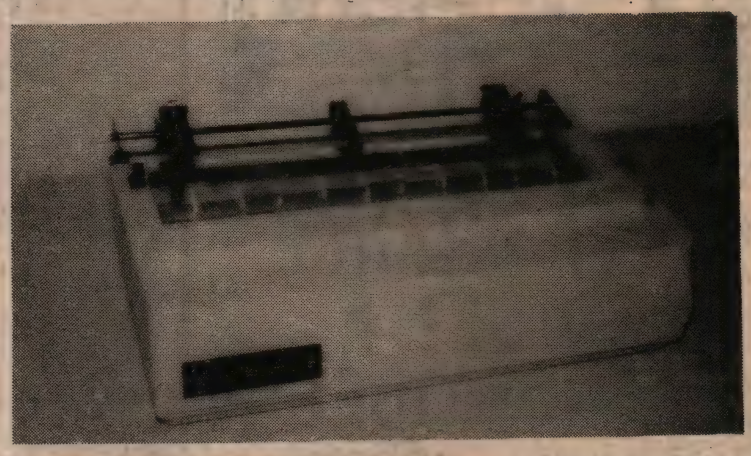
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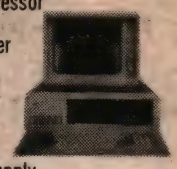
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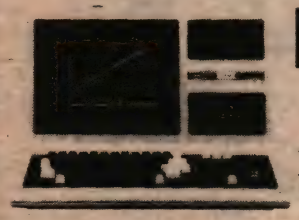
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11/03 Computer $900
Dual RZ-1 disc $1,000
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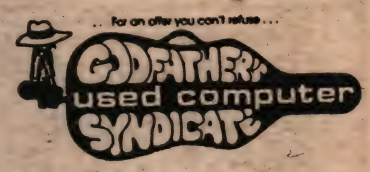


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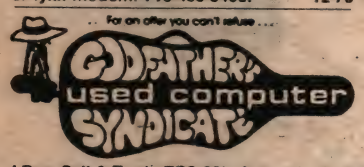
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(104A) TEXAS INSTRUMENTS COMPUTERS WANTED

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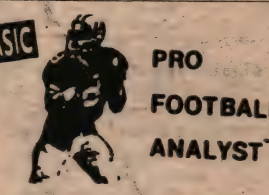
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SOFTWARE and HARDWARE for the TI-99/4A. Hundreds of items. parallel printer interface $59. Gemini Printer SG-10 $219. Extended Basic $55. Dow flight simulator $26. Infocom games $29 to $36. Terminal Emulator II $19. Send $1 for complete catalog. Specify System. **Multi Video,** PO Box 246, E. Amherst, NY 14051. 12-74

Survey-Boundary TI-99/4A basic $29.95. Manual only $1.00. **P. Billings,** Dept. CSB, 12134 Bonnie Terr., Seminole, FL 33542. 01-77

TAX INSIGHT 85 for the TI 99/4A. Works with Multiplan. Includes 1040, 2441, 3903, A, B, E, G, W. $19.95. **Micro Insight,** Box 2033, Universal City, TX 78148. 01-75

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TI99/4A Arcade game software. Five X-Basic games on cassette only $12.50. diskette $17.50. Send stamp for catalog. **Best Software,** PO Box 22446, Baltimore, MD 21203. 11-72

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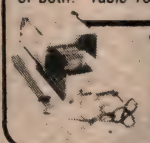
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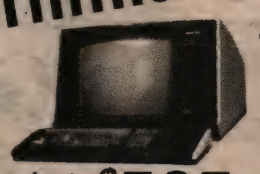
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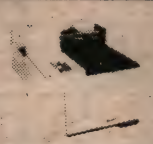
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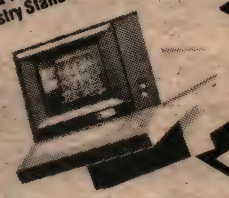
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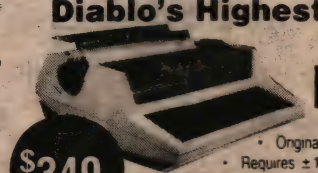
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MULTIFUNCTION CARD** The older style with only 256K RAM On board with Serial, Parallel ports, Clock, Calendar. A very good style card on sale while they last, this is a copy of the earlier AST 256K multifunction cards. Complete with all assembly data.....$19.95

384 RAM*** RAM only in close array, 384K of 64K RAM ideal for economy enhancement of system capacity. With all assembly data.....$19.95

512K CARD*** Another very economical expansion card. Takes 64K RAM In close array. With all assembly data.....$24.95

KRAM CARD*** We took a 512K card and rewired it for 256K RAMS. It now has four times the memory or 2 MBYTES. It closely follows the function of the popular JRAM card as all this type do, and also shares partitioning parameters to the extent that it will run the JRAM software or other similar programs. RAM Disc Drives are very easy to delineate. With all assembly data.....$34.95

PROTOTYPE CARD. 100% WW holes with DB-25 and DB-9 footprint on end.....$24.95

MEMORY PROTOTYPE CARD. This unique card has a memory array at one end. 36 16 pin sockets are placed in copper on board with all bussing in common, but with CAS, RAS etc brought out row by row and column by column so that either 64K or 256K RAMS can be quickly wired in. A 0.1 bypass cap is on each IC as well. The remaining ¾ of the board is 100% WW holes with a DB-25 and DB-9 footprint on one end.....$24.95

EXTENDER CARD. When you need to service a card with power on it is very hard to get at the board to trace signals etc so we made this little gem that lifts the whole thing up by about 6" for easy access.....$19.95

A ¼ size card with two serial ports on board.
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HARD DRIVE

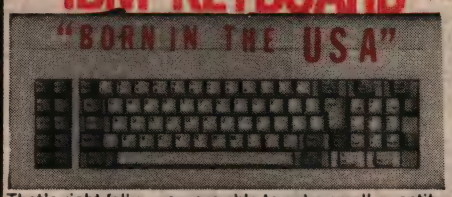


SWITCHING 75 watt SUPPLY

+5VDC @ 5.5A +12VDC @ 4A −12VDC @ 0.3A

GREAT BUY ONLY $44.00

KEYTRONICS 5150
IBM KEYBOARD



That's right folks, we were able to get a small quantity of genuine KEYTRONICS 5150 BRAND NEW US made IBM type keyboards for a really low-low price. However they will only last for a few short weeks so order right now as we want ot move them real fast at only....$79.95

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One of the nicest open frame IBM type switching power supplies we have ever seen. Came from the defunct NCR IBM compatible, runs the whole thing, has +5V-7A, +12V-3A, -5, -12-¼A. A very good unit for starter system. Will not run hard disc system. a real Steal at.....$39.95

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AN IBM® XT COMPATIBLE 8 SLOT MOTHERBOARD

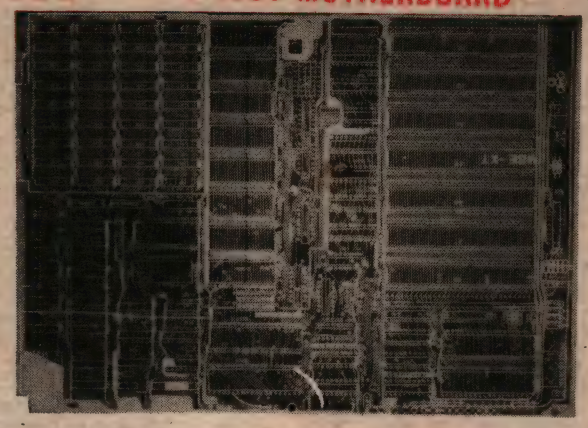
MBE-XT BARE PCB WITH MANUAL AND SCHEMATICS.
$39.95

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What is your time worth?? We have had a bunch of MBE-XT boards stuffed and wave soldered so you can save all that time soldering them up. All you need are the IC's memory, and BIOS and you are set to go $159.00

FULLY WIRED AND TESTED WITH 64K ON BOARD WITH MEGABIOS AND MANUAL

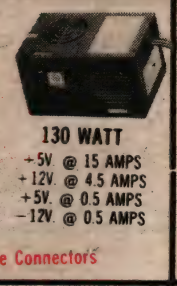
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- UP TO 256K DRAM ON BOARD
- HAS DIGITAL DELAY LINE FOR ERROR FREE MEMORY REFRESH
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- WILL RUN ANY COMPATIBLE BASIC
- IBM POWER PLUG COMPATIBLE
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- RUNS PC-DOS AND CPM-86
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SWITCHING POWER SUPPLY $99.00

Exact fit to our PC/XT case



130 WATT
+5V @ 15 AMPS
+12V @ 4.5 AMPS
+5V @ 0.5 AMPS
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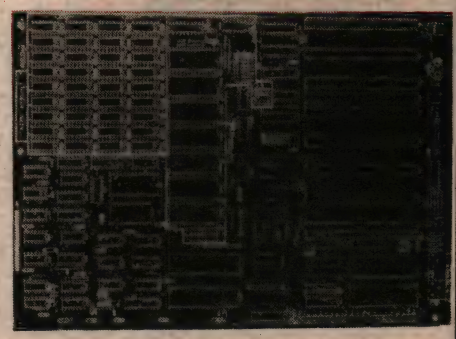
4 Drive Connectors

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- UP TO 640K DRAM ON BOARD
- 8 IBM COMPATIBLE EXP SLOTS
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- RUNS PC DOS AND CPM 86
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WIRED OK RAM
$179.95
WIRED NO IC's
(LAZY BOARD)
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NEW—640K
IBM XT Compatible 8 Slot Motherboard



We have worked and sweated over the MBE-XT board and have found a way to modify it and to take 256K RAMS so that you can use 2 rows of 256K and 2 of 64K to get a total of 640K of DOS viewed memory (Up to 1 Mbyte with special software). It has all the features of the MBE-XT plus the extra RAM and the size is exactly the same as the XT motherboard with all the same slot and hole spacing to fit our cases listed on this page and take the power supplies we sell as well. Of course it costs a tiny bit more, but $10.00 is worth if for the extra RAM.

$49.95

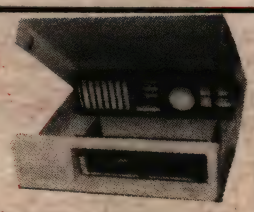
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185Watts, MADE IN THE USA by POWER ONE. This unit is BRAND NEW, NEVER USED, TESTED and very HEAVY DUTY. Fully enclosed, 13x5x2.5" with Push-on and screw terminals.....$49.95

+5V-25A
+12V-3.5A
−5V-1.0A
−12V-1.0A

IBM CASE

$59.95



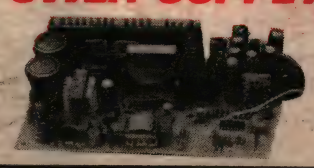
We have the nicest case of all the various competing cases, ask any friend who has bought someone else's case and then has seen ours. The lid is hinged with pushbutton access. The back is cut for 8 XT slots and it comes with all the case back inserts for cards, card guides, blind disc filler plates, standoffs, feet, screws, all for .$59.95

Please specify back or side cutout for power supply.

We also have an IBM 8 Slot/6502 Board dual duty case for making IBM look-a-like 6502 systems.....$79.95

MEGABOARD CASE, similar to the above, but no pushbuttons or hardware, from DTC in Dallas Texas. A stronger US made case, but less finishing parts. Fits the MEGABOARD exactly with side cut extender, for back power supply.....$89.95

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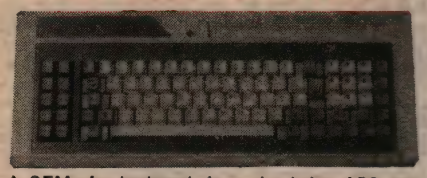
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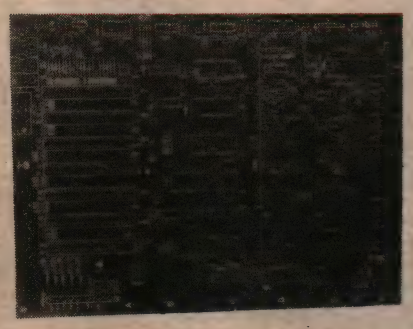
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A GEM of a keyboard, in a nice beige ABS case. Lets you build an IBM look-a-like that runs like a IIE with 2 drives in case using our $69.95 case on this page. This KB is fully IIE compatible, with all functions.....$149.95

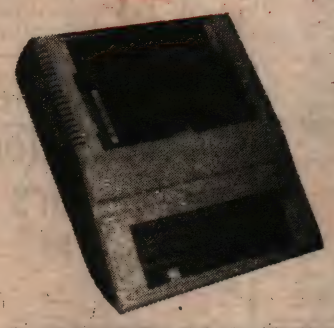
MOTHER BOARD



100% IIe® Compatible, for those of you who wish to build a clone of the very popular APPLE IIe® . This board is a reverse engineered copy of the IIe® and is 100% compatible. We have the motherboard and the custom ICs only. All other parts are widely sold. The custom ICs are workalike chips that do not infringe any copyrights. The software for operating the board must be obtained elsewhere as we do not have it for sale. When we say 100% we mean it.

A very good buy at	$49.95
Custom IIS set(2)	$49.95
Keyboard encoder (AY3-3600)	$14.95
Character generator, U/LC	$14.95

IIe® ABS PLASTIC CASE
$49.95



This case is made to fit the Mother Board listed here for making IIe® clones and it makes a very nice looking copy. There is just enough difference to avoid design infringement. The case also has no brand names or other marks on it.
A good buy at $49.95

IIe® MATRIX KEYBOARD
$69.95

This keyboard fits the above case and has 100% clone compatibility, it will allow operation of all IIe® commands. Another bargain at $69.95

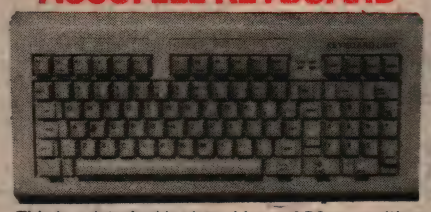




The famous **APPLE-SEED** and APPLE-SEED II are the books that see all, tell all on the various APPLE clone motherboards and peripherals. They are well worth the $12.95 that we are asking. And KOSMIC has been at it again on IBM clone motherboards and peripherals and has composed the one and only "BIG BLUE SEED", it goes into greater detail on a smaller number of motherboards and peripherals (over 20 and growing) and will help you to build many of them at a saving.

APPLE-SEED I Motherboard book.....$12.95
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MAK II
ACCUFEEL KEYBOARD



This is a detached keyboard in an ABS case with a 6" curly cord to connect ot to 6502 based machines. It used a serial data format for error free transmissions down the curly cord with a serial to parallel to converter board on the end that is fully 6502/ Apple compatible. Has auto repeat, beep, no beep. 10 user programmable macros, 50 preprogrammed macros, auto line number,
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FRANKLIN COMPATIBLE

PARTS

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2.2Kx9SIP	$0.79	2N3906	$0.29
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HARD DRIVE
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MADE FOR TWO ½ HEIGHT DRIVES
SPACE FOR POWER SUPPLY, FAN ETC.

40 WATT POWER SUPPLY..$40.00
60 WATT POWER SUPPLY..$60.00

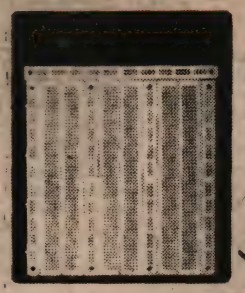
ASCII KEYBOARD
8048
5v only

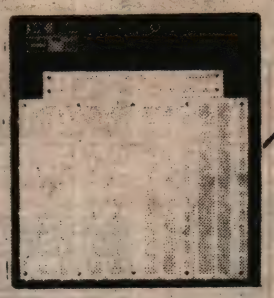


New Serial Parallel
$19.95

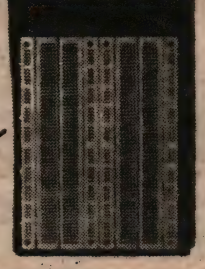
A great deal, this brand new ASCII keyboard came from AES DATA, one of the largest makers of word processors in the world. A novel circuit generates both serial and parallel ASCII out allowing use on both APPLE and IBM styles of system. The unit runs on +5V only, has Hall effect keyswitches and uses an 8048 micro for operation. The sculptured keytops are arranged in typewriter style for quick learning and are an attractive light beige color. We got them for 5% of the $169.00 that AES paid and so we can sell them dirt cheap and still make money. Completely new with 20 pin ribbon IDC connector and pinout for easy interfacing.....$19.95

Solderless Breadboard





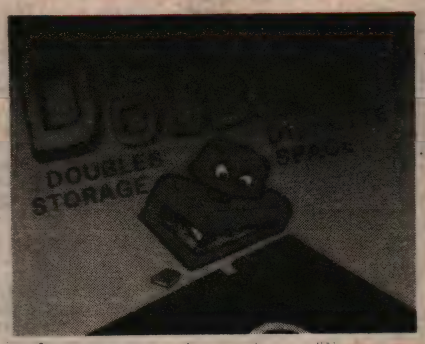




Solderless prototyping boards are the best way to quickly breadboard up a circuit. The holes are made especially for IC's, resistors, and other small parts with 22-28 gage wire leads, takes WW pins too.

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3 IC strips, 5 power strips
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Disc Doubler



DISC DOUBLER.....$5.95

3 WAY SWITCHED SCOPE PROBE



We have other probes, ask for our mini-catalog

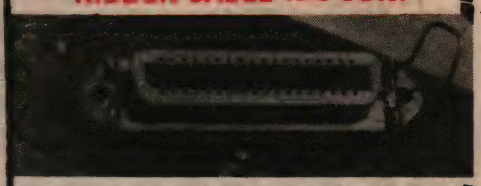
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1 ×1 POSITION
DC – 10 MHz
35 nS
55 p.F. + Oscilloscope Input Capacitance
1 MΩ (Oscilloscope Input)
600 Volts DC Including peak AC,

2 ×10 POSITION
DC – 100 MHz
3.5 nS
Nominal 16 p.F.
10–60 p.F.
10 MΩ When used with oscilloscopes which have 1 MΩ Input.

3 REF POSITION
Probe tip grounded via 9 MΩ resistor,

CENTRONICS
RIBBON CABLE IDC CON.

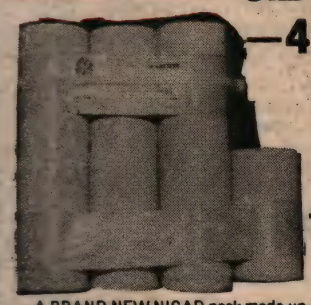


Ribbon Cable Type Centronics and DB-25 Connectors

DB-25 Male	$2.49	DB-25 Female	$2.49
Centronics Male	$2.95	Centronics Female	$2.95

HURRY WE WILL SOON BE SOLD OUT AT THESE PRICES!

NICAD PACK 8.2 volt —4 amp hour



$14.95
7D cells

A BRAND NEW NICAD pack made up of American NICADS by GE. Each pack has 7 cells at 1.2 volts each. Full D sized and rated at 4 Amp hours this is a very good value. Consider the price of D cells at retail for $5-$6 each and you will agree they are cheap at.....$14.95

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NEW LOWER PRICES

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A KNIGHT IN TRANSYLVANIA

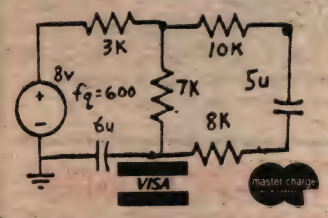
A complex, finely detailed adventure game for Commodore Computers. It features quick response times and a large vocabulary. Be prepared to spend many enjoyable hours solving this adventure. Each disk has versions for the C64, the C128, and 80 column C128. Send check or money order for $10.95 to: S.O.S. Software, PO Box 155, Coden, AL 36523. Write for our free catalog. 01-73



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A large software manufacturer goofed! They made 1000's of copies of their programs and then they found the bugs in the programs. Instead of re-using all of these disks, they gave some of them to us to liquidate. These are top quality Xidex, 3M, Nashua, Wabash and Data Encore disks. These disks have met far more exacting tests than almost all new disks since each one has been individually written on and then tested for read-write errors according to the exacting specifications of the manufacturer. They have been bulk erased (degaussed) and are totally blank and ready for formatting. We are selling them in lots of 100, 250 and 1000, compelte with envelopes and labels. You can have 1000 SSDD disks for $470 (47¢ each), 250 for $127 (50¢ each). or 100 for $59 (59¢ each). return or replacement for 30 days if not 100% satisfied. Shipping and insurance add $5 per 100 disks. Call **BCE Liquidators 202-944-3900.**



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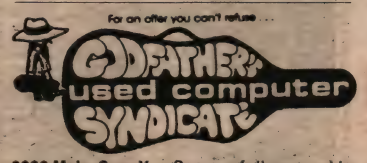
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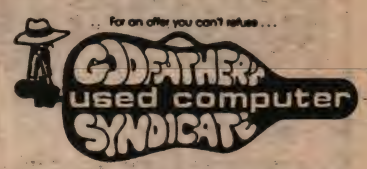
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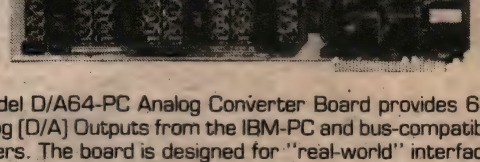


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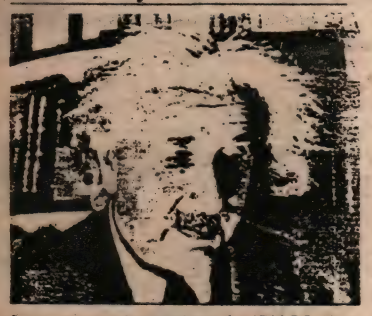


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PUBLIC DOMAIN SOFTWARE for Sanyo MBC computers, all tested on Sanyos. Games, financial, utilities, more. $1 (refundable) for catalog. **Software Library,** PO Box 204, Prosser, WA 99350.

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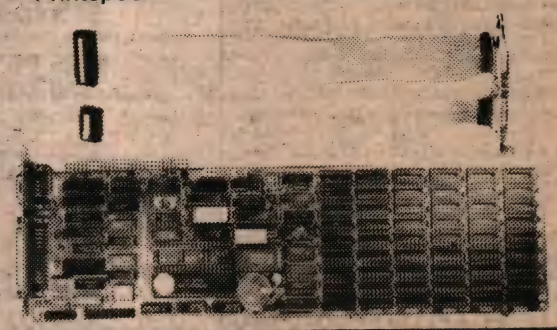
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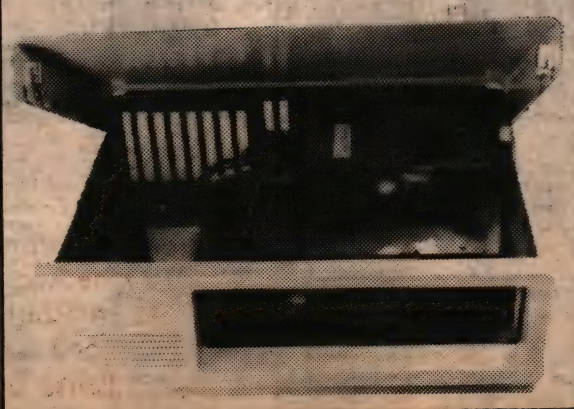
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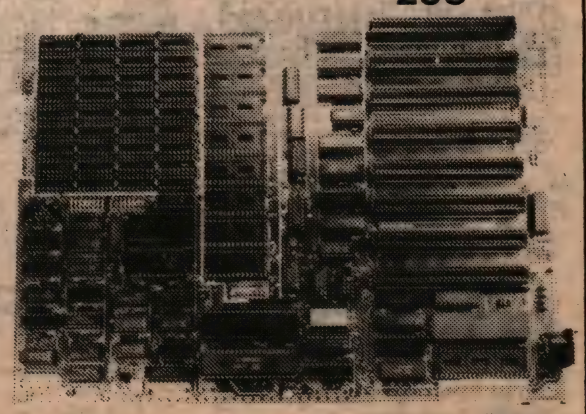


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MONITOR-DYNAMICS WINCHESTER CONTROLLER runs 8" and 5", with CP/M auto-install or Turbo-DOS software, Mint $350, package with Seagate 19 megabyte Winchester $550. **Bob, 516-921-1465.**

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Musys Multiuser Systems
System 1. 5 user with 2-30 MB hard disks, 1-1.2 MB Floppy, tape back-up and 5-televideo 925 terminals, $6,000.00. System 2. 3 user with 1-16 MB hard disk, 1-1.2 MB Floppy, and 3-Televideo 925 terminals, $3,50.00. System 3. 2 user with 1-16 MB hard disk, 1-1.2 MB Floppy, and 2-Televideo 925 terminals $2,000.00. All systems include Tubodos operating systems, communications software, cables and dust covers. **Paragon Computer Corporation,** (203)525-0389. 12-73

Northstar Horizon (S100), two DSDD, 64K, CPM, 50 disks $650pp. CRT terminal - add $100.00. **Doug at (408)274-3616.** 12-72

RURAL HIGH SCHOOL seeking the donation of a multiple user CP/M system for instructional purposes. Contact **Jay Jacobsen,** Computer Instructor, Rifle High School, Rifle, CO 81650. 303-625-1596.

S-100 CARD SALE!!

S-100 ENTHUSIASTS! Write the S-100 BOARD BANK for savings on USED items. Subscribe to THE STATEMENT, the irregular, official organ of THE S-100 BOARD BANK. Send $4.37 or more to **S-100 Board Bank.** Mailorder Dept. C2, Box 344, Olympia, WA 98507. 1-77

S-100 SYSTEM complete or individual boards - 64K memory RAM17, IO-4 SSM, CPU, Video, Vector case & power supply. Quite reasonable. **301-831-7086** evenings.

TELETEK FDC-1 single board computer with EPROM burner, M-1 & M-5 monitors with CP/M $275. **Systemaster** single board computer with CP/M $370. **X-Comp** S-100 hard disk controller & data board with CP/M driver software for Miniscribe, New, $220. **Miniscribe** 5¼" 10 meg. hard disk $325. Miniscribe 5¼" 8 meg. hard disk $300. **Systems** S-100 DM-6400 with 64K, $175. **Systems** S-100 DMB-6400 with 64K & Cromix adapter $225. Several integrand cabinets with power supplies with S-100 slots & misc. power supplies. **Percy 509-488-2851.** PO Box 608, Othello, WA 99344.

VECTOR GRAPHIC 3005 (made up from VG parts): drive reads double and quad density disks, 64K memory, 5MB hard disk, etc., plus clock. NEC 7700Q converted to serial. Both for $2800 plus shipping. **Time Series Assoc.,** Tel. 415-324-1821. 1-73

VECTOR S-100 computer Z-80 CPU, 48K, terminal and two drives complete working with CP/M, basic & wordstar, extra boards included, $600 or trade. Call **Jeff Gong,** 606-326-8437 or write 6206 S. Park Ave., Tucson, AZ 85706.

WANT S-100 CARDS!

BOARD BANK BUYS 'EM ALL! (Well, almost.) ROM, RAM, CPU, VIDEO, GRAPHICS, I/O, AD/DA, FDC, HDC, SPEECH, the uniquer the better! Convert your extras to CASH. We buy SYSTEMS, peripherals too. Send FULL description and CHEAPEST asking PRICE to **S-100 BOARD BANK,** Mailorder Dept. C-1, Box 344, Olympia, WA 98507. 1-77

(130) S-100 COMPATIBLE, PERIPHERAL

5 Megabyte Hard Disk Drive Subsystem for all S-100 systems. Kit $450. **DIGITAL SEARCH. 803-877-9444.**

8K STATIC RAM $25. 2-Calcomp 142 8" w/Imsai case, $225. 2-Calcomp 140, w/case $200. 1-Adds Regent 60 CRT $225. Centronix 781 printer $85. **615-355-1061.** Jim Carroll, 304 Lexington Dr., Smyrna, TN 37167. 1-77

Alloy Tape Backup Unit with S-100 control board & software. $750. Excellent Condition. **Paragon Computer Corporation, (203)525-0389.** 12-73

COMPUPRO CPU 8085/8088 $125. CPU-Z $100. Disk 1 $225. SS 1 $200. Int. 3 $275. Enclosure 2 $400. Dual 8" Qume $650. Imsai SIO-2 $40. **408-423-0122.**

COMPUPRO/VIASYN CPU 8086 $300. Disk 1A $260. Disk 1 $160. CPU 85/88 $175. Disk 3 $300. CPU 68K-10mz $250. M-driveH 512K $275. Disk 2/channel selector $225. RAM 23 128K $275. RAM 22 256K $600. RAM 16 $115. RAM 17 $130. Enclosure with 20 slot motherboard and power supply $275. 20 slot motherboard $90. 12 slot motherboard $65. CPU-Z $165. Mint DS/DD 8" floppy drives $80 each. **Jim Hoffman,** 6909 Sylvan Glen Way, Citrus Heights, CA 95610. 916-726-3291.

CONTROLLER/HARD DRIVE COMPUPRO/VIASYN disk2 with 8" 20mb Fujitsu drive. Drive is in cabinet with power supply and cables, $575. Mint 8" DS/DD floppy disk drives $80 each. **Jim Hoffman,** 6909 Sylvan Glen, Citrus Heights, CA 95610. 916-726-3291.

Disk Jockey Controller: Morrow DJ2D-B FDC for S100's complete with over 30-8" diskettes of software; $150. **Skip Lightsey, 303-665-7858 (evenings!.**



8" SSSD Disks 89¢
with envelopes

Xidex 3M Nashua, etc.
A large software manufacturer goofed! they made 1000's of copies of their programs and then they found the bugs in the programs. Instead of re-using all of these disks, they gave some of them to us to liquidate. These are top quality Xidex, 3M, Nashua, Wabash and Data Encore disks. These disks have met far more exacting tests than almost all new disks since each one has been individualy written on and then tested for read-write errors according to the exacting specifications of the manufacturer. They have been bulk erased (degaussed) and are totally blank and ready for formatting. We are selling them in lots of 100, and 1000, complete with envelopes and labels. You can have 1000 disks for $890 (89¢ each), or 100 for $99 (99¢ each). Return or replacement for 30 days if not 100% satisfied. Shipping and insurance add $5 per 100 disks. Call **BCE Liquidators, 1-800-545-7447.**

MICROPOLIS CONTROLLER & drive $169; Promblaster $95; GB Z80 6MHZ $150; Ad SuperSix $369; 64K print buffers $125; North Star DD controller $150. **818-716-5220.** 1-73

MORROW HDC/DMA 5" hard disk controller $235. DJDMA 5"/8" floppy controller, $200. HDCA 8" or 14" hard disk controller $125. DJ/2DB 8" floppy disk controller, $60. Wunderbuss mother board with serial and parallel I/O built in $70. 20 slot motherboard $55. **Jim Hoffman,** 6909 Sylvan Glen, Citrus Heights, CA 95610. 916-726-3291.

S-100 17-SLOT motherboard. New, factory assembled Micromation. Shielded, terminated, good to 10 MHZ. $100. Call **Paul Pennington,** 404-863-7285 or -1254.

S100 BOARDS, CCS 2810A..CPU + 1 serial port $99. INTERFACER I..2 serial ports..AS IS (complete)..$25. **CSS 408-248-0134.** 3675 DeSoto Ave., Santa Clara, CA 95051 12-72

.. for an offer you can't refuse ...
Godfather's used computer SYNDICATE

$$$$ I buy, sell & trade Hewlett Packard Computers. **Godfather's Syndicate,** 1154 W. SR 436, Forest City, FL 32714. (305)774-1111. 01-73

(131) S-50 COMPATIBLE, PERIPHERAL

5 Megabyte Hard Disk Add-on for SS-30 or SS-50 from $450, with software and interface. **DIGITAL SEARCH 803-877-9444.**

(132) HEATH COMPUTERS FOR SALE

H89 SINGLE floppy, 64KB memory with C compiler, Fortran, Wordstar, Basic, plus much more. $500. Ask for **Chuck, 818-357-9527.** 1-73

Z-100 LOW profile, 768K, 8MHz, color, 2-5¼ drives, GEMINI board, color monitor, all manuals for machine, lots of software. AMADEX 9501 printer, 15" carriage, graphics, serial/parallel, 200 CPS, Multiple fonts. Sweet-P plotter. $3500 for all, shipping included. Call: **Jim** 216-984-2685 or **Art** 216-282-4790. 1-73

(132A) HEATH SOFTWARE, PERIPHERAL

5 Megabyte add-on Hard Disk Subsystem for Heath-89. Kit **$650. DIGITAL SEARCH 803-877-9444.**

FOR SALE: Heathkit Microprocessor trainer ET-3400 with training course, $200. Call **715-423-9084.**

HEATH H8 Model WH8-16 16K static memory board, factory built, excellent condition, $35 PP. **Dick Leroux,** Box 724, Massena, New York 13662.

PREOWNED SOFTWARE for H/Z-100. Lotus 1-2-3 $65. Wordstar 3.3 with Mailmerge $75. Z-Basic $50. GW Basic $50. Cobol $50. dBase II $60. Sideways $20. Informer $20. Genie $25. PC Emulator $25. Additional programs available, ask for list. **505-266-2344.** 12-73

SPEED MODULE for Heath H89. Software selectable 2/4 MHz. No board modifications required. $34.95 including shipping. **Micronics Technology,** 449 Barbados Way, Niceville, FL 32578. 904-897-4257. 12-73

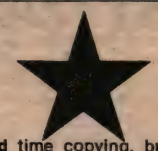
ZENITH COMPUTER equipment from authorized dealer at discount prices. For information contact **Norman Clearfield,** 312-383-5280.

ZENITH Z100, runs CP/M and MS-DOS, dual processors, 10 megabyte hard disc, color monitor, wide carriage prowriter printer; Z basic Lotus 123, ZDOS included. $4700 or best offer. Call Wm. Sturm, **217-546-4738** office or 217-546-3757 home.

ZENITH ZWG-120-32 and IDS prism-132 for sale. $2400. Or best. Contact **Phil Melburg,** Boy Scouts, 301-530-9360. Includes software.

(133) BURROUGHS SYSTEMS

BURROUGHS B-92-CSY, 3/6 MB inbuilt mini disk, 38.7 MB fixed disk, memory upgrade 128 to 256, two peripherals. Reasonable offer. Contact Charlotte **205-556-1943. 10-74**



Why Spend time copying, buying blank diskettes, and paying rental, deposit, documentation, and return postage fees? We give you 35 programs (games, utilities, business, educational), ready to run with full printed instructions, for only 28 cents each. Send $9.80 (CA add 6%) plus $1.50 s/h to: **The Software Shack,** Dept.10, Box 133, Fresno, CA 93707.

(134) HEWLETT PACKARD COMPUTERS FOR SALE

41C Card Reader $110, printer 82143A $160; PPC ROM $40; Manuals, all like new, 41C w/Mem. $40. **Robet Klingsten 813-627-1396.**

HP-150 TOUCHSCREEN w/256K, 9121 dual drives, Memomaker, Cardfiler, MS-DOS/owner's manual, and Lotus 1, 2, 3, Demo unit like new, $1800. H-P dual bin Sheetfeed, Model 26010D, for H-P 2601 printer, List $2290 for only $500. Like new. **S. Mills,** 4615 Orleans Blvd., Jefferson, LA 70121. **504-733-9611.** All add-post.

HP-150 with 15MB hard disc. All software imaginable. Must sell now. Touch screen. One owner. Perfect shape. $2800 firm. Call **501-377-2093 now.** 11-74

.. for an offer you can't refuse ...
Godfather's used computer SYNDICATE

$$$$ I buy, sell & trade Hewlett Packard Computers. **Godfather's Syndicate,** 1154 W. SR 436, Forest City, FL 32714. (305)774-1111. 01-73

(134A) HEWLETT PACKARD COMPUTERS WANTED

(134B) HEWLETT PACKARD SOFTWARE, PERIPH.



HP-71B SPREADSHEET

ORDER SS71. Use your time solving problems, not writing programs. SS71 is the first, best, and lowest price true spreadsheet program for the HP-71B. Many features. Fully portable on the LCD, or full-screen editing on the 80 column video. Four data entry modes. CALC, BASIC, SS71, or your program. Add cells with plug-in RAM. Values, labels, formulas, and custom formats. Send $60. Receive SS71 on a new HP 3.5 inch disk to tape cassette (your choice), instructions and sample data. Mail to **Rich Hairston,** 1226 Mission Ave., Carmichael, CA 95608. 01-73

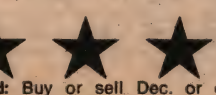
STOCK MARKET programs for HP 86/87 computers. Powerful programs for selecting and evaluating stocks and commodities. Send $39.95 to **Lock Software,** Box 3163, Baltimore, MD 21228. Specify disk size. 9-79

(136) DATA GENERAL SYSTEMS

ECLIPSE: CPU/120 (512 KB), SC Memory w/ERCC 64KB, SC Memory/S230 128K. 100/200/300 disk control (Zebra 96 MBY). Disk Subsystem - any CPU. Line printer controller/ECLIPSE, NOVA, MV PROCESSORS. (Call for complete list). **C.P.M., 415-493-5930.**

(138) DATA GENERAL SOFTWARE PERIPH.

(148) DEC SYSTEMS FOR SALE



Comp-Used: Buy or sell Dec. or other systems, peripherals or software. Any computer product over $100. **203-762-8677.12-73**

DEC PDP 11/03L, 64kb, dual RX02 floppies, DLV11J interface, power supply, standalone cabinet, LA120 keyboard printer, Zenith Z-19 CRT, RT11 system software plus ODT, Fortran, Basic, Dibol, all manuals, $2,800. **Gary Leino,** 510 S. Bryan Circle, Brandon, FL 33511. **813-684-1659.**

DEC PRO350 system. One Pro350 w/512K, RX-50 drives, 10M HD, floating point adaptor, LQP02 Printer, maps/Pro Financial Planning Software and RDM Relational Database development software included, $5500. Will sell printer and software separately, printer $1500, RDM $300, MAPS/PRO $500. Also have a Pro350 as above w/o HD and FP adaptor. Includes RDM software for $2000 total. **S. Mills,** 4615 Orleans Blvd., Jefferson, LA 70121. **504-733-9611.** All add-post.



DEC Rainbows 100B 128-893K, CPM/DOS, some graphics, color, large amount of software. Start at $1800. **305-777-4663 or 773-3417.** 01-75

DECmate II WP system. Mint condition. All software and documentation, plus CP/M option board, MBASIC, DF03 modem. LQP02 commercial letter quality printer with forms tractor. System costs $10,000 new; will sell for $3250. **201-889-5520.**

DEV VAX, PC & Microvax hardware & software consulting. **John, HCI, 612-884-8925.**

Dec Dual 5.25" Disc Drives (180 AB) new, unused $250 ppd. Only One (has case power supply and fan), **PO Box 13, Ellenton, FL 33532.**

MICROVAX-New systems with 190mb disk, reel-to-reel tape available and Decnet. Call for specifics. **301-490-3608.** 01-77

PDP11/03 COMPUTER. 64K, EIS/FIS, dual floppies, 3 serial, 2 parallel, HT11/RT11 compatible. Includes OS, basic, fortran, "C", macro assembler software and documentation $1500; Televideo BT970 VT100/VT52/DS40 compatible terminal $700. Call **Jim 404-642-1722 (evenings) or 404-529-5451 (days).** 01-73

PDP11/23 System 160kb, MMU, FPU, floppy, 10mb disk, multiple ports, terminals, printers, spares, DEC installation- $9000 complete. Ideal for laboratory/educational applications. **Ed 614-846-6248.** 01-73

PDP15 COMPUTER two hard disks, three Dec tapes, Graphics 15VT console, cables, books, etc. $4750. **Andy Parramore,** Box 17, Mt. Pleasant, FL 32352. **904-856-5525.01-73**

VT-100 ..... **$449.00**
CIT-100 ..... $375.00
TVI-925 ..... $375.00
Checked out, guaranteed. **C.P.M., 415-493-5930.**

(149) DEC SYSTEMS WANTED

DOS for DS310JA 8/A500. **Jim Kelley,** 827 Northwestern, Ames, Iowa 50010. **515-232-2119.**

Rainbow 100+ or 100B, letter quality printer. **616-244-5686** or 61445 Main St., PO Box 57, Jones, MI 49061.

(150) DEC SOFTWARE, PERIPHERAL

(2) RX01 floppy disk drives, $100 + $250, Rackmount and tabletop enclosure, DR-11C $50, Diablo Hytype printer $75. **DJT 5504 Gardner Place, Springfield, VA 22151.**

DEC Letterprinter 100 (LA-100). Excellent condition $500. **405-529-2715.**

Dec Classified software. MBASIC $60. CP/M 80/86 2.00 $75. Multiplan $65. **818-334-1185.**

Decwriter III. Good condition, great for data printing $250. **405-529-2715.**

Diskettes RX50 format base w/lib case $23.50 (Decmate, Pro, Rainbow, Microvax)... **Sunrise Data Systems, 603-429-1217.**

(154) IBM SYSTEMS FOR SALE



Comp-Used: Buy or sell IBM or other systems, peripherals or software. Any computer product over $100. **203-762-8677.12-73**

For Sale: IBM PC XT, color monitor, 640K memory, one DSDD floppy drive, one ten megabyte hard disk, and hundreds of high quality, professional software packages. Will sell all or part. Send SASE for complete list to: **Ray Texeira,** 20295 Anita Ave., #6, Castro Valley, CA 94546.

IBM MAINFRAME - System 3 Model 8 with 3 hard disk drives, line printer, two data entry consoles, complete system. Excellent condition, $1500. Call **315-986-2719.** 11-73

(155) IBM SYSTEMS WANTED

Paying $5.00 per pound for scrap tantalum capacitors. Any amount, fast payment! Ship: **Sciuto,** 103 Saratoga St., Lawrence, Mass. 01842. 9-79

(156) IBM SOFTWARE PERIPHERAL

★

COMPUFUN IS FINALLY HERE

Makes great entertainment and most valuable gift 20 categories of raunchy jokes IMB compatible disk $7.95. **LB Enterprises,** 30 E 42nd St., Room 906, NYC, NY 10017. 11-72

CROSSTALK XVI, open systems general ledger and team manager with Basic interpreter. Make offer. **Louis Saparito,** College Ave., Lima, NY 14485. 10-72

Engineering, science, and math students and teachers: if you're using Wordstar with an Epson, Gemini, or compatible printer, throw your pen away. Final Draft, a text post-processor, generates 36 Greek letters and math symbols (including 7 user-defined characters), true superscripts, subscripts, overscores, and underscores--all with conventional Wordstar commands. An unadorned version of this program is in use by tech writers at a Fortune 100 firm. For disk with program and full documentation, send $10 (really, how can you go wrong for ten bucks?) and specify Apple CP/M or MS-DOS on check. For more information and print samples, send SASE. **Heritage Graphics,** PO Box 95, Pemberton, NJ 08068.

★ ★

GOT AN IBM PC or Compatible? Our home and independent study programs teach you everything from the fundamentals of computers, dos, fundamental programming, basic, and pascal. For info and a free diskette full of goodies send $5 to **Micro-Education Systems,** PO Box 47194, Wichita, KS 67203.

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HOT ITEM

PROVEN Fractal zoom graphic program for IBM PC and alikes. Requires COLOR monitor and 64K memory and PC-DOS or MS-DOS. Creates startling images by new **Virtual Graphic(tm) Process.** Program on disc - $14.95 includes postage and tax. Specify your system and disc format. Inquiries use SASE. VISA or MC O.K. **Herzog Company,** Dept. S5, 200 Monterey St. Suite 11, Brisbane, CA 94005. 12-73

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(HYPERION PORTABLES)
$1250. IBM compatibles with 256K, 2 drives. Otrona 8/16 portables, $1100. CP/M/MSDOS IBM compatibles. **Mr. Manolli,** 818-706-6482, 714-581-6761.

IBM Color Graphics for PC. Only 2 left! $100 each, brand new. Also, IBM PC keyboards with PCjr adaptors, $160 for whole unit (not sold seperately). **Legacy Technologies Ltd., 402-466-8108.** 01-73

IBM PUBLIC DOMAIN

300 VOLUMES-RENT AND COPY for $1 each or we copy for you $3 SSDD; $6 DSDD. Directory disk $3. Sampler $5. Mastercard, Visa! Recorded info/order 619-941-3244 (anytime) or LSASE (specify computer): **Futuresystems,** Box 3040(C), Vista, CA 92083.

MICRO-CAP engineering design and analysis, it covers analog & RF circuits, DC and AC transient responses, $200. Will ship COD to buyer or send $200 money order to: **ESS,** 5005 Richmond Ave., Suite #176, Houston, TX 77056.

PUBLIC DOMAIN software for the IBM PCjr. Sample disk $6. Free list. **RPM,** Dept. A, 2019 Foucher, New Orleans, LA 70115.1-74

SEE OUR Ad in section 115B for best in Public Domain and User Supported Software - **Blue Circle Group, Inc.**

TOPVIEW $69. Display Write 3, $159. Three new,, were bundled with XT's. **507-289-0400.** 1-73

(166) MISC. (HARDWARE & SOFTWARE)

AT&T 3 B 2

CORPORATE DECISION to change market focus has forced our software development firm to offer for sale excess equipment including a two month old 3B2/300, AT&T's new 32 bit multi user computer, with 1MB of main memory, 32MB hard disk, 4 port expansion board, and UNIX System V operating system. Also TI-810 printer and AT&T 4410 CRT. All priced below our cost at $13,500, well below approx. retail of $18,500. Call Marty at **904-386-5184.** 1-73

DIGI-DATA CORP 3500 Mag Tape Reader: Incl lockable rack mount cabinet, logic pkg., D.B.T.S., phase encoded formatter, synch tape transport, gen purp intfc., system disks (8"), GTCO test tapes, 5-vol. instruction manuals, schematics, mech drawings. System mates with AM Varityper 504. Too beautiful to scrap just because typesetter upgraded to different equipment. SASE: more details, photos. $500 + shipping. **D.R.K.,** 886 Eggert Drive, North Tonawanda, NY 14120.

WANG 2200 MVP SYSTEM - 256K. 3 each 22C12 Disc Controller. 2 each 2260C 10 Meg. Disc Drive (Diablo). 1 each 2260 10 Meg Disc Drive with WCS Enclosure. 2 each 2236MXD 4 Port Terminal Multiplexer. 5 each 2236DE Interactive Terminal. 1 each FREEDOM 100 Synergetic Terminal. 1 each 2281W 30 CPS Daisy Printer with controller. 1 each 2221W Matrix Printer with stand. WANG Maintained - original owner. Phone **217-322-4346.**

(172) DISK DRIVES

8" DS/DD - 2 Shugart 850/851 drives in case with power supply $450. 2 Tandom 55-4 drives, 96 TPI DS/Quads. No Bezel or Latching Levers $35 each **512-673-1861 12-73**

CMI5412 hard disk drives 5¼" full height, 10 megabyte, $250. 503-942-7581. 11-72

Cabinet for two 8 inch disk drives. Rack mount style. Fan, all AC and DC wiring with power supply $100. **Cascade Electronics, Inc.,** Route 1, Box 8, Randolph, MN 55065. **507-645-7997.**

★ ★ ★

Comp-Used: Buy or sell any system, peripherals or software. Any computer product over $100. **203-762-8677.** 12-73

DISK DRIVES-BOUGHT & SOLD. 5¼ half height for IBM, Radio Sh. TEAC-55B $79. Panasonic 551-2 $7S. Hard drive 25MB Disctron $325. 40MB Evotech $450. 19MB CMI $250. 5MB Tandon $70. Comrex plotter $219 (Sweet Pea compatable). **LCAL,** 52 Brookfield, Centereach, NY 11720. 516-732-1779. 12-73

DISK SERVICE MANUAL, DISK DRIVE TUTORIAL, PRINTER - PLOTTER MANUAL, COPIER MANUAL, COMPUTER PHREAKING, SUPER REINKING METHOD - More!! See enclosed display advertisement. Ifnormation ($1): **Consumertronics Co.,** Attn: Computers, 2011 Crescent, Alamogordo, NM 88310. 12-76

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DRIVES FOR SALE

SHUGART SA800-2 $79, SA 801R $89. SA 850/850R $129. SA 851R $139. TEC FB-501 5¼" ½ ht. SS/DD $59. 60 day warranty, shipping extra.

DISK DRIVE SERVICE

SHUGART SA 800/801 $25. SA 850/851 $35. 5¼" SS $25. 5¼" DS $35. 8" SS $40. 8" DS $50. Price includes complete alignment, bench and system test. 60 day warranty. Parts and shipping extra.

SPECIAL SALE

MPI 52S 5¼" DS/DD full ht. $55 plus shipping. **LDL Electronics,** 13392 158 St. N., Jupiter, FL 33458. 305-747-7384.12-72

FUJITSU hard drives 20mb with power supply, cables, and cabinet, $375. 10mb with power supply, cables, and cabinet $235. Bare 20mb $275. Bare 10mb $150. 26mb 14" drive not working $85. Mint 8" DS/DD floppy disk drives, $80 each. **Jim Hoffman,** 6909 Sylvan Glen, Citrus Heights, CA 95610. 916-726-3291.

HARD DISK DRIVES (8") Quantum Q2020 20meg $450, Q2040 40meg $650, 110V & 220V models Shugart SA1004 10 meg $175, not working $75. **CSS 408-248-0134. 12-72**

Hard Disk Shugart 1106 8" 27 megabytes, excellent condition without controller $140. **Bob Brodsky, 703-256-6607.**

Innovex 200 8" SSSD Drives, excellent quality. Can be used double density. 4 for $100. Complete, but require alignment or adjustment. **DIGITAL SEARCH 803-877-9444.**

8" SSSD Drives. $75. Can be used as Double Density. Removed from operational equipment. Shugart 8" 50 Hz, 220V conversion kits also available. **DIGITAL SEARCH 803-877-9444.**

Micro-floppy 3½" drives. 500k bytes Shugart SA300 w/warranty -$169 each. NEC FD1035, DSDD (1meg) -$175 each. Same interface as 5¼" drives. **DIGITAL SEARCH 803-877-9444.**

Micropolis 1053-II meta-Floppy, 2 dr. total 630 KB capacity, hard Sector (16), with S-100 Controller card, disks, (but no software) manual, $125. **Len 212-777-4353.**

SHUGART 8" SSDD like new $119. Shugart SA400L 5¼" new $75. SA-400 logic boards, $20. SA-800 logic boards, $20. **Percy 509-488-2851.** PO Box 608, Othello, WA 99344.

Shugart 851 drives, mint, newer version needing no minus supply. Complete with cables and schematics. **414-547-7866 evenings.**

Shugart SA800-2 disk drives removed from service, tested and guaranteed 60 days $59; SA850 removed from service and guaranteed 60 days $99; **Cascade Electronics, Inc.,** Route 1, Box 8, Randolph, MN 55065. **507-645-7997.**

TWO 5¼ DSDD SHUGART SA455 IN FLOPPY DISK SERVICES CASE #7 with power supply. Like new conditon. $200. Call **612-429-8193** after 6pm. 12-72

Tallgrass 20 + 20 hardisk and tape backup. 20 meg each. List 3450 will sell $2000. Like New. **Louis Saparito,** College Ave., Lima, NY 14485 10-72

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Tallgrass Model 3020 $1149!

20 mg hardrives with tape back up unit. 30 day guarantee-quantities limited. Call **BCE 202-944-3900.**

Tandon TM848 8" half heights. DSDD repair units, 30 day warranty $150 each. **Call 817-572-3996.**

WANTED 1541 Commodore Disk Drives. $85 for those in working condition. Please call **800-221-7770** 4-74

WINCHESTER DRIVES: Seagate ST-506, 5¼", 5Mbyte, hard disk drives with manual. Excellent condition. Limited quantity. $95 delivered. **John Hanson,** Winter Springs, FL. Phone **305-699-0124.** 12-72

WINCHESTER SWITCHER

+12/2.7A (4A Pk)
−12V/0.1A +5/3A



Connector for drive. Connector for SASI Card. ON/OFF Switch, RFI Filter, Line Fuse, 110/220V. Selector Switch, International Line Cord Connector. Mounting for fan if needed - or - the supply may be removed and mounted in a separate housing. Quantities available .....$14.95/ea. **C.P.M., 415-493-5930.**

WINCHESTER LINEAR

POWER-ONE CP-417. 4-7/8"x8¼"x3¼" 100-240VAC 50/60Hz, +5/4A, +12/2.5A (7.5A surge). For the most exacting, noise free applications where possibly more than one large, full-height drive is being used in a system .....$29.95 **C.P.M., 415-493-5930.**

Winchester controller board will run most popular 8" Winchester and floppy disk drives. SASI host buss. Two types available. SMS type FWD 5001 that supports IBM compatible single and double density floppy formats. SMS type FWD 5001C3 that supports a uniform floppy format. Both types support up to 2 Winchester drives and up to 2 single or double sided floppy disk drives. 1 pc $75; 2 pc $140; 5 pc $300; 10 pc $500; 25 pc $1000. **William Wood,** 4863 S. Livonia Rd., Livonia, NY 14487. **716-346-3304.**

Winchester Controller Kit. Will control most all popular hard disk drives $200. Faster than Western Digital WD1002 Controllers. SA1002 8" Hard Disk Controller also available. **DIGITAL SEARCH, 803-877-9444.**

Winchester Drive Sale. Shugart SA1002. 8"-5 megabytes unused $99 each, controller kit $200. **DIGITAL SEARCH 803-877-9444.**

(174) PRINTERS

16K MICROBUFFER Practical Peripherals 16K Parallel printer buffer. Mounts inside Epson MX printers, new, unused, $50. **716-593-5329** evenings.

C. ITOH, NEC owners - get Correspondence Quality print with our ROM installed. Our font replaces Proportional font. All other functions remain. If you have older C. Itoh or NEC 8510 or 1550 (with plastic bottom plate), send $30 + $5 S&H ($40 + $5 for newer style unit) for ROM and instructions, or SASE for sample of print qualities to: **Microtrend Computers,** 56 Ferris Street, Corning, NY 14830. **607-936-3053.** Allow 3 weeks for delivery. If ordering, please specify old or new style. Money back if not satisfied. 01-74.

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CUSTOM WORDSTAR Instructions for Epson, Star/Gemini, Panasonic, Citizen, BMC, Legend, Olympia, Okidata, Prowriter printers; get boldface, continuous underlining, super/subscripts, compressed, enlarged characters and more. $10, specify computer and Wordstar version. **LAI,** PO Box 13118, Minneapolis, MN 55414. 11-72

CUT SHEET FEEDERS



WOULD YOU BELIEVE? A $119 cut-sheet feeder for: DEC LQP-02; QUME - all Sprint models (except Sprint 5); NBI - 64, 8, 3000; Apple - LQP; A.B. Dick - MGNA-SL, MGNA III. Looks better to us than Sorbus' $395 model. Never used/in original factory boxes. If you need more than 10, call for special pricing! Mfg. for Apple Computer by Major Mfg. Mechanical type, driven by gear teeth on platen (we are told, by those who tinker with such things, that this feeder can be modified to work with Diablo Printers - after all, Qume was a Diablo Spin off...**But we don't guarantee it!**). **C.P.M., 415-493-5930.**

DEC Letterprinter 100 (LA-100). Excellent condition. Over 200 cps. $500. **405-529-2715.**

DIABLO 620 PRINTER. 3 month Xerox warr., $595. Sam, **415-452-1004.** PSS, 632 E. 14 St., Oakland, CA 94606.

DOT-MATRIX 132-CHARACTERS wide Practical Automation printer DMTP-6. RS-232 (to 1200 baud) or parallel ASCII input. Includes mechanism, control electronics, supply, cables, rack-mount hardware, and complete documentation, $60. **Peter, 813-327-5675** anytime. 12-73

Dataproducts M200 Printer 340 CPS dot matrix, Centronics input, $1000. Teletype AP200 printer (same ad DP M200) RS-232 Input $1000. **Len 212-777-4353.**

Decwriter III printer/term. Good condition. Fast print speed $250. **405-529-2715.**

Diablo 630 Letter Qlty. printers..like new, perfect condition, from $875. 630 API (serial & parallel) $1160. 630 KSR (with keyboard) $1395. Diablo 1650 KSR, metal wheel, 45 Cps $925. Model 620, 24 Cps $525. Full Warranty. Superior equipment at excellent prices! **Expansion Products Service Company,** (Certified DIABLO Service Center). Contact us for full details & pricing: PO Box 4217, Mountain View, CA 94040. **415-965-7222.**

Diablo P-11 dot matrix printer, (list $649) unused $200 each. 90-day warranty. 100 CPS parallel interface, excellent quality. **DIGITAL SEARCH, 803-877-9444.**

Diablo or Qume printer **power supply kit.** $75. New QUME pin feed platens. $40. **DIGITAL SEARCH 803-877-9444.**

Diablo print wheels #38100-02 Zerox #9R80057 Courier 10, #38102-02 Zerox #9R80059 Elite 12, #38107-01 Zerox #9R80064 Courier 72. $3.00 each or 6 for $15. **Cascade Electronics,** Route 1, Box 8, Randolph, MN 55065. **507-645-7997.**

Diablo printer Accessories: Forms Tractors for 630 & Hytype II Printers; Uni-Directional $95, Bi-Directional $195 (new), $165 (used). Sheet Feeder, mechanical, $425 (new) $350 (used). Dual Bin Sheet Feeder, Automatic, processor Controlled, for Diablo 630 $995. **Expansion Products Service Company,** PO Box 4217, Mountain View, CA 94040. **415-965-7222.**

EPSON LX80 with optional tractor. Three months of light home use. Like new condition, with documentation in original box, $175. **Frank Days,** 103 W. Main St., Niantic, CT 06357. **203-739-4670** evenings/weekends.

Epson MX-100. Excellent Condition. $300.00 firm. **Paragon Computer Corporation,** (203)525-0389. 12-73

FOR SALE: IBM Selectric terminal taken out of service. 15" carriage, do-it-yourselfer. Can be made into letter quality printer or Selectric typewriter or both. We tell you how. $95.00. **Ron's Electronics,** N5509 Sunset Vista, Onalaska, WI 54650. **608-783-5341.**

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GOULD PLOTTER Colorwriter 6120 for sale. Never used; full warranty, $995. Retail - special price $595. **Software City,** NJ, 201-391-0931. 12-72

HIGH SPEED PRINTER
Model CI-600 C. ITOH Line Printer, includes printer stand, like new, Asking $3,000. Call 214-922-0099.

IBM LETTER quality printer/typewriter, 15 inch carriage, microprocessor controlled interface. Takes care of all timing and code conversion. Dual interface uses either serial or parallel, depending on your computer needs. Baud rates adjust from 110-9600. Built-in self test to check out proper operation of interface and printer. All units come with backspace and are cleaned and rebuilt. They are set up for standard type elements. Can also be used as a standard typewriter. Immediate shipment $369. **Ron's Electronics,** N5009 Sunset Vista, Onalaska, WI 54650. **608-783-5341.**

IBM color printer, 200 cps draft, NLQ mode, $1995 list, asking $1000. **405-529-2715.**

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IDS Prism 80 - 240/110 cps draft/correspondence serious printer; sheet feeder, graphics, high speed options, serial/parallel, like new, in original packaging $1395 new, **must sell** $490. Call now **404-447-4731** leave message or write **George Sipe,** 4873 Scotts Mill Way, Duluth, GA. 30136.

Interface Kit for Diablo or Qume printers RS232 or Parallel. $95. parts for Qume and Diablo HyType I: Repairs, cases, power supplies. **Digital Search, 803-877-9444.**

JUKI 6100: Daisywheel printers if your printer is defective and Juki Industries or their distributor has declined to honor it's warranty to you. Please write to me regarding all the particulars write to: **DWP/6100,** POB 613, Pocono Pines, PA 18350-0613. 10-74

Junkman Will Buy! I buy old scrap IC's, relays, circuit boards, diodes, any mixed junk, gold plated, transistors, connectors, dirty, broken, smashed or useless electronic junk - any amount! 1930 to 1985. Nothing refused! 10 years in business. Pack in boxes and ship UPS. Fast payment! **JUNKMAN,** 103 Saratoga St., Lawrence, Mass. 01842. 9-73

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Multi-Strike IV Ribbons fits Qume 9, 10, 11, Abati + Apple LQ, DEC LQP-02 $36/dozen. **Len 212-777-4353.**

NEC 2050 LETTER QUALITY, IBM parallel interface, Mint $450; bi-directional tractor $120; both $525. 6050 interface $30 or trade 6015. **Bob, 516-921-1465.**

NEC 3510 Spinwriter, 35 cps daisywheel, works great, Tract/Frict feed $900. **405-529-2715.**

NEC Spinwriter: Model 3515, letter quality with forms tractor. 80 cps, letter quality, serial interface; Extra thimble and documentation included $875. **Skip Lightsey 303-665-7858 (evenings).**

Okidata 80 CPS, 7x9 Dot matrix, friction feed, 10 characters per inch, 6 or 8 lines per inch, built in self test, new ribbon, 60 day guarantee, removed from service, parallel interface $99. Serial Interface $119. Tractor feed free with printer. **Cascade Electronics,** Route 1, Box 8, Randolph, MN 55065. **507-645-7997.**

Okidata ML83A printer, 15" carriage, 120 cps, 2 years old, good condition, $300. **Rob Lee,** 25 Amaryllis Ave., Waterbury, CT 06710. 1-73

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PRINTER LIQUIDATON
WIDE CARRIAGE
EPSON COMPATIBLE
$249

Canon PW 1156A wide carriage printer with externally switchable near better quality option. 160-180 cps with parallel interface. See our full page ad. **BCE 800-545-7447.**

Printers. Okidata ML83A. Excellent condition. $300.00 firm. **Paragon Computer Corporation,** 202-525-0389. 12-73

QUME SPRINT 10/35, Serial, $400; bi-directional tractor $100; both $475. **Bob, 516-921-1465.**

RIBBONS: BROTHER/COMREX/DYNAX. Film: 6/$22.50; Nylon: 6/$27; Multistrike: 6/$30. Daisywheel $21.95. Add $3 shipping. **Kyntek Marketing,** PO Box 13070, Minneapolis, MN 55414. 612-379-1020. 11-72

Ribbon for Hytype II Diablo #40980-08 cloth $2.50 each. **Cascade Electronics,** Route 1, Box 8, Randolph, MN 55065. **507-645-7997.**

SWITCHING POWER supply for Diablo Hy-Type I & II, $70. Diablo 1329 power supply for Hy-Type I $49. Serial board for MX-80 $39. Graftrax ROMS for MX-80 $20. **Percy 509-488-2851.** PO Box 608, Othello, WA 99344.

TTY Model 43 KSR hardcopy terminal/printer 10/30 cps, RS232, like new, Make offer. **Call John, 609-266-7088.**

Texas Inst 820 KSR pkg. Printer 150 cps, 1K Buffer, RS-232 $600. **Len 212-777-4353**

Tractor feed for Microline 80 or Microline 82. New in box $35. **Cascade Electronics,** Route 1, Box 8, Randolph, MN 55065. **507-645-7997.**

WANTED BROKEN Okidata Microline 82, 83, 92, 93 printers. Also wanted IBM Comp. Monitors etc. **702-456-5318** or write 2417 Vista Colina, Henderson, NV 89105.

WANTED: EPSON, Prowriter Dot Matrix printers. Please describe types, conditions, extras (manuals, buffers, tractor feeds, stands, etc.) prices. **Williams,** 2011 Crescent, Alamorgordo, NM 88310. 12-76

WANTED MX80 with Centronics parallel interface. Must be in excellent condition. Give details and best price with shipping. **Joe,** 51625 Chestnut, Granger, IN 46530. 12-72

WANTED: OKIDATA SL125 or SL160 printers, broken or working, we pay shipping. **614-436-8080.** 11-76

Zenith Z-125 Dot Matrix printer. 9x9 Matrix, excell of 150 cps, 10, 12, 13.2, 16.5 characters per inch. Full 95 character ASCII font plus block graphics. 256 character buffer $395. **Cascade Electronics,** Route 1, Box 8, Randolph, MN 55065 **507-645-7997.**

(178) TAPE DRIVES

APPLE 9-TRACK TAPE DRIVES — Read/ write standard ½-inch, 800 BPI, IBM compatible tapes on an Apple. Exchange data with minis and mainframes. Backup floppies and hard disks. $1000-$2100. **Electrovalue,** Box 376-C, Morris Plains, NJ 07950. 201-267-1117. 8-78

CASSETTE DRIVE, ICP/PI-70. 232-Kilobytes plus parity on one 90 minute audio cassette. Bi-directional tape access 800 + bytes/sec. Error (1ppm. Small, w/rack-mount hardware. New, unused, w/manual, $85. **Peter, 813-327-5675** anytime. 12-73

DC-300 STREAMERS: Cipher: Quarterback 90ips $199.00
Archive: Sidewinder 90ips $199.00
C.P.M., 415-493-5930.

DIGI-DATA CORP 3500 Mag Tape Reader: Incl lockable rack mount cabinet, logic pkg., D.B.T.S., phase encoded formatter, synch tape transport, gen purp intfc., system disks (8"), GTCO test tapes, 5-vol. instruction manuals, schematics, mech drawings. System mates with AM Varityper 504. Too beautiful to scrap just because typesetter upgraded to different equipment. SASE: more details, photos. $500 + shipping. **D.R.K.,** 886 Eggert Drive, North Tonawanda, NY 14120.

IBM-PC 9-TRACK TAPE DRIVES
Electrovalve Industrial, a pioneer in providing industry standard 800 BPI 9-track tape drives for the Apple (see article, April Computer Shopper, p. 46) now has a product for the IBM-PC. Exchange data with minis and mainframes. $1000-$2100. Call for brochure. **Electrovalue Industrial Inc.,** Box 376-CP, Morris Plains, NJ 07950. 201-267-1117. 7-77

½" Mag Tape drives. New and used. Wanco 7" & 10" from $150 to $400 each. **DIGITAL SEARCH 803-877-9444.**

(180) CRT'S

TELEVIDEO 925 Terminals. Excellent Condition. $400.00 firm. **Paragon Computer Corporation,** 203-525-0389. 12-73

(181) TELE-VIDEO CRT TERMINALS

BT970 VT100/VT52/DS40. Similar to TVI970, but emulates VT100/VT52 and Bell Dataspeed 40/2. Character sets and all keys are programmable $700. **Call Jim 404-642-1722 (evening) or 404-529-5451 (days).** 01-73

Need the TVI-90 maintenance manual, schematics and parts list. Write to: **Hans Stauffer,** M-105, PO Box 020010, Miami, FL 33102-0010.

TELEVIDEO 950. Almost new, less than 100 hours. Original carton with user manual and RS-232 cable. $350. Only one to sell. **817-336-9891.** 11-72

TeleVideo 912 - smart terminal, many attributes, 2 pages memory, numeric pad, printer port, in original packaging, **must sell** $280. Call now **404-447-4731,** leave message or write **George Sipe,** 4873 Scotts Mill Way, Duluth, GA 30136.

Televideo 925, Good condition $250 pp. **405-529-2715.**

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Televideo 925's
$325!

Many available: reconditioned, with 30 day guarantee. Call **BCE 202-944-3900.**

Televideo Computers for sale - TS806/20 with NETWORK-OS $3200. TS800A $500, TS803 $1350, TS800 $600, TS802H/20 $2150, TS802 $1200. **Richard A. Seale,** 1800 Commerce, Boulder, CO 80301, **303-449-4897.** 01-73

(182) TERMINALS

ADDS CONSUL-520 w/detachable keyboard, numeric keypad, reverse video, 110 to 9600 baud w/documentation $175. **Peter, 813-327-5675** anytime. 12-73

ADDS REGENT 25 $240. Adds Viewpoint $275. Tandy DT-1 $240. **Percy, 509-488-2851.** PO Box 608, Othello, WA 99344.

ADDS Viewpoint + Ergo with original 90-day warranty. $400. **DIGITAL SEARCH 803-877-9444.**

Beehive CRT's and parts for sale, rent or lease. Repair exchanges also Cado beehives and cromemco 3102's. Superbee II's, B100, B300/400, B500/550, Microbee, DMIS DM20/30, DM83, DM3270, DM standards, ATL083, ATL3270, ATL004, and more. Call **Mark (916) 677-0355** 10-78

DEC Terminals: VT-102 with A.V.O., white phosphor with keyboard, $1,100. VT-220, amber phosphor with keyboard $1,000 or best offer. Both like new, in the box, with manuals. **Wesex Corp.,** Box 246, West Middlesex, PA 16159 (412) 528-2800. 12-73

DIABLO 620 PRINTER. 3 month Xerox warr., $595. Sam, **415-452-1004.** PSS, 632 E. 14 St., Oakland, CA 94606.

H-19 TERMINALS: 24 x 80 display with a glare screen - $150. Motorola Monitor, TTL input, supports 24 x 80 display - $25. **512-673-1861** 12-73

NEC and USI green composite **monitors** for Apple/IBM. Like New! $70 each. **Skip Lightsey, 303-665-7858 (evenings).**

Portable Teleprinter: TI model 765, with internal bubble memory and internal modem. $125. **Skip Lightsey, 303-665-7858 (evenings).**

TERMINALS. HAZELTINE 1500 video $300. Dec LA36 printing terminals $400. **Anthony Nowakowski,** 2294 Long Road, Grand Island, NY 14072. 716-773-3821. 1-73

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Televideo 925's
$325!

Many available: reconditioned, with 30 day guarantee. Call **BCE 202-944-3900.**

VISUAL 50, 12" green screen, software set-up, detached keyboard, $250. **Visual 55,** same plus 12 user-programmable function keys, $275. Mint in original boxes. **Bob 516-921-1465.**

(183) MULTIBUS BOARDS

AMD one Megabyte memory board. Asking 600. Also ISBC/215 and ISBX/218 controllers for $800. **Hoy Nuen, 408-720-9953.**

Cromemco ZPU $100; 256KZ $200; 64KZ2 $50; PRI $50; WDI2 $100; Tu-Art $50; 64 FDC $100. FC **Ed or Jim 616-327-6736.**

DRAM MEMORY 512K (200ns) w/ECC by Intersil. (qty5) $750 each or offer. 256K (200ns) w/Parity by Intel (qty1) $300 or offer. **Jeff Shaw,** Box 32900, San Jose, CA 95152. **408-258-4059.** 01-73

INTEL ICE-85 set w/probes $390. Intel ICE-80 set $250. Intel double-density floppy controller $350. isBC-80/20-4 single-board computer $180. isBC-108 combination memory and I/O $120. Intel communications expansion, serial I/O ports $100. Intel 16Kbyte RAM $70. Intel 8080 CPU module (Intellec MDS) $80. Intel monitor and I/O module (RS-232 and parallel) $80. Intel 4-slot Multibus chassis $290. isBC-635 power supply for above $180. Kepco-RMX09-D 5v 37amp switcher $260. Documentation for each of above $7. **Peter, 813-327-5675** anytime. 12-73

Intel 86/30 SBC-8086 based single board computer, with 128k memory - new $85; Serial multimodules (351) $6. Call **301-498-0121.** 01-73

(184) MEMORY

(186) MODEMS

1200-baud Western Electric modem module provides direct connect to phone line. Two for $100, with schematic. This is an excellent value for the technically-oriented hobbyist who wants high-speed modem communications. **DIGITAL SEARCH 803-877-9444.**

BULLETIN BOARDS IN NORTH AMERICA. You've tried the rest, now try the best! Our directory is used by Byte magazine, IBM, Xerox and many others. Quality versus quantity! Over 700 listed by state, area code and computer type. Each listing commented. $5.95 postpaid or subscription 1 year (4 issues) $16. **BBS Directory,** Box 4150-CS, Vero Beach, FL 32964-4150. **305-231-0912.** 01-73

Datacom Management Sciences SP-25-MV RS-232 Test set, built in PS, DVM, Break-out box, rack mount $795. **Len 212-777-4353.**

Digital patch Unit Spectron DPU-2403-16 RS-232 Circuits + 1 DPM-516 test/power module per rack unit (6 avail.) $500 each. switched Digital Patch Unit (similar to above) $750. **Len 212-777-4353.**

FREE! SHOP by Modem! Call our innovative electronic shopping center, **Fantasy Plaza,** by Modem (818)840-8066. 11-79.

GENERAL DATACOMM 2400ASM (2400 baud) modems. Two in perfect condition. $100 or best offer. Call **Mort at 305-866-8631.**

General Datacomm 9600 modems (PC card) (4 pcs) $750 each. GDC 2020 short haul modems (PC card) (11 pcs) $150 each. Card cage w. power supply (2pcs) $250 each. **Len 212-777-4353.**

Halcyon 802A data link monitor portable/rack test set-RS-232, sync. or async. 50 - 56K baud, 7" CRT, good cond., w/manual. Asking $2200. **Len 212-777-4353.**

Micom 828 Data Concentrator (8 ch Multiplexor-Rack mount) $850. **Len 212-777-4353.**

New Novation SmartCat 300/212 Modem, new, $250. **Rob Lee,** 25 Amaryllis Ave., Waterbury, CT 06710. 1-73

RACAL-VADIC 3451 Bell 212 and 103 compatible. Manual or auto-answer. Adapts to speed of incoming calls. Full duplex, direct connect. w/supply and documentation, as is $175. **Peter, 813-327-5675** anytime.12-73

Racal—Vadic Modems-VA 1616 Chassis with (2) 3467 Ans only triple modems (2) 3481 orig/Ans triple modems (2) 2010 Power modules $1200 for all, also A-J 1259 Stand alone triple modem $200. Racal Vadic 3455 stand alone $150 each. **Len 212-777-4353.**

TWO MULTITECH 440/MX modems w/direct phone hookup, acoustic, and magnetic couplers. 202 type, good to 1800 baud, with spare parts. Both modems for $60. **Peter, 813-327-5675** anytime. 12-73

Western Electric 208A 4800 BAUD modems, used, $200. **Len 212-777-4353.**

(187) WORD PROCESSING

DIABLO 620 PRINTER. 3 month Xerox warr., $595. Sam, **415-452-1004.** PSS, 632 E. 14 St., Oakland, CA 94606.

IBM WORD PROCESSERS SYSTEM O.S./6 Model 450 ink jet printer original cost $30,000, sale price $5,700. **Lust Cash Register 305-896-6530** 12-73

WANTED: USED Processors, Computers - IBM, Xerox, NBI, Lexitron, CPT, Wang, Etc. Call **Exsel Incorporated,** Used Office Automation Specialists, 716-325-5530, 1-800-624-2001 4-74

WORDSTAR COMMANDS on thirty-two 3x5 Roladex(tm) cards. Indexed with command summary & correct syntax. $12.95 (PP & MBG). **Brian Lewis,** 6423 Caracara St., Sarasota, FL 34241. 10-74

(188) MISC. EQUIPMENT

150 Watt Switching power supply. Made by Astex for TRS80 Mod.II 110/120 input +5V/8.6A, +12V/4.5A, +24V/1.7A, -12V/0.2A $25. 2 for $40 with manual. **817-489-2145.**

3BUTTON MOUSE - Hawley Mark II Like New/Original carton. Specs w/list of available interface boards. 200 ppi resolution. Sample interface schematic. From Cad/Cam system. New $250/Asking $90. Includes shipping Cont. US. **DATA PROCESSING SERVICES,** 339 Barton Place, Menlo Park, CA 95024. 8-73

Biomation K-100D Logic Analyzer 100MHz Sixteen or 32 channel input, 1024 word memory. Time and data domain analysis, resolution 10 ns, minimum pulse width 5 ns. Two qualifiers. Search and compare modes. CRT display, fixed TTL, ECL and 2 variable thresholds to -6.4 V and + 6.35 V. Good Cond., w. manuals, but less probes. $1950. **Len 212-777-4353.**

Buying Computer and Electronic plate, all types precious metal's including higher and lower grade gold and silver industrial or electronic findings, circuit boards gold and silver coins, coin collections, jewelry and diamonds. No shipment too small. Fast confidential cash payments, **Phone 404-881-9833** Ship: Stephen West, 1020 Peachtree, N.E. Atltanta, GA 30309 10-72

CALLAN UNISTAR 200

Unix Multi-Bus 20 MBY System "SUN" CPU $3,495.00
C.P.M., 415-493-5930.

Cromemco CLQ Printer $100; Cromemco 3103 printer $50; Televideo 925 $250; Black Box printer spooler (New PS16) $150. FC. **Ed or Jim 616-327-6736.**

Draw Pictures with HI/LO res drawing programs for Apple II. $5. **Skyline Software,** 804 39th Ave., Greeley, CO 80634.

Echo II Speech Synthezier, $95 with software. Will trade Apple DMP or buy Imagewriter (used/new). **713-782-0456, Houston, TX.**

Epson PX-8, Multiunit; portable thermal printer, cables, $1200 pp. **405-529-2715.**

For Sale: Intertec Headstart Model 512 computer system. Includes 3" & 5¼" drives, 512K ram, CP/M, MS-DOS. Dealer cost $2900. Asking $2000. 1 Year old -like new!!! **William M. Richman II,** 1004 Washington St., Lincoln, NE 68502. **402-477-6377.**

For Sale- Hayes Smart modem 300 with Smart Coml Software for Apple IIE or IIC $175. **Warren F. Fusselle,** 722 N. Pinetta Dr., Richmond, VA 23235.

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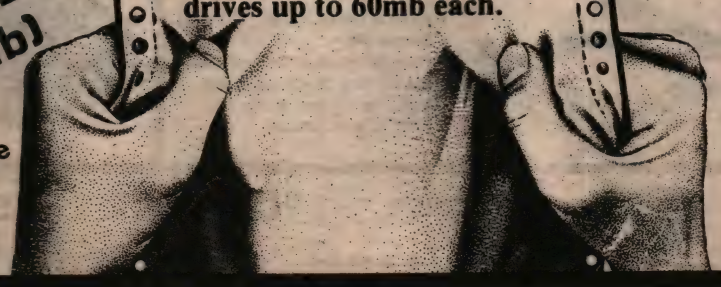
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Expansion slot	8 IBM PC compatible slots
DMA	4 channels
Timer	3 channels
Interrupts	8 levels of vectored interrupts
Parallel port	1 Centronic printer port
Keyboard port	1 five-pin connector for an IBM PC compatible keyboard
Reset port	A reset switch for hardware reset
Serial port	2 serial interfaces RS-232, 110 to 19,200 baud
Speaker port	1 connector for external speaker
Floppy drive port	Controls up to four drives
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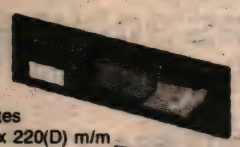
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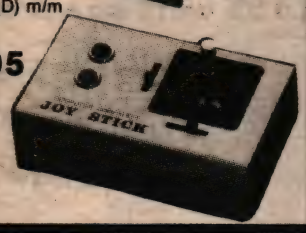
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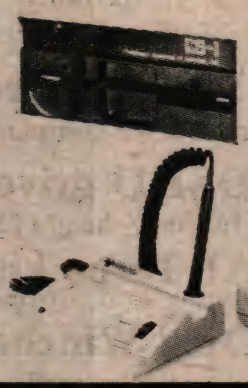
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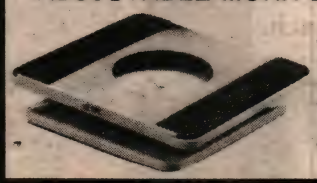
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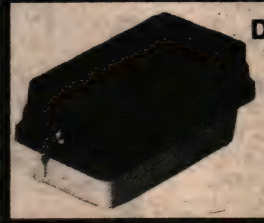
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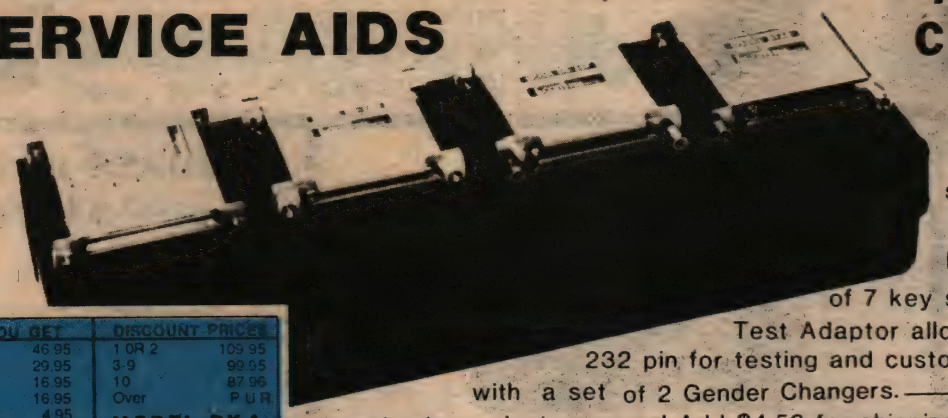
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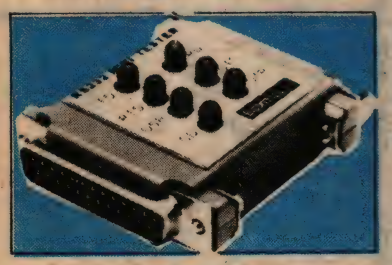


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Four of our most popular RS232 devices in a hand some carry case. Our best Data Line Monitor shows high, low, and open status of 7 key signal lines. The mini Data Test Adaptor allows access to every RS-232 pin for testing and custom interfacing, and comes with a set of 2 Gender Changers. ——— A limited time offer at reduced prices – Just compare! Add $4.50 for shipping and handling regardless of quantity. Use our Toll Free calling for prompt delivery.

WHAT YOU GET		DISCOUNT PRICES	
DLMS-2	46.95	1 OR 2	109.95
DTAS	29.95	3-9	99.55
DG25F	16.95	10	87.96
DG25M	16.95	Over	PUR
Carry Case	4.95	MODEL DK4	
Total Value	115.75		

DATA LINE MONITOR



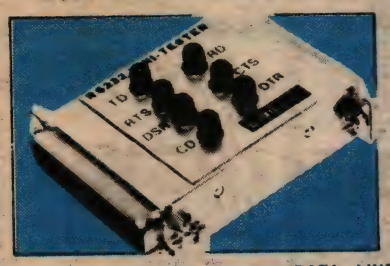
A miniature **DATA LINE MONITOR** allows the user to determine the status of the seven key signals of the RS-232 data path. All 25 pins wired through. Dedicated red LED's report the status of:

Transmit Data (TD) pin 2
Receive Data (RD) pin 3
Request to Send (RTS) pin 4
Clear to Send (CTS) pin 5
Data Set Ready (DSR) pin 6
Data Carrier Detect (DCD) pin 8
Data Terminal Ready (DTR) pin 20

Choice of Plastic or Chrome Metal Housing.

MODEL	TYPE	GENDER	1-9	10-24	25-99
DLM	Std.	M-F	35.45	32.26	28.36
DLMS	Metal	M-F	36.95	33.62	29.56

DATA LINE MONITOR



New Deluxe Version of our popular **DATA LINE MONITOR** is now available with red and green LED's to indicate Hi, Low or Open conditions. Metal shell construction takes abuse.

MODEL	TYPE	GENDER	1-9	10-24	25-99
DLMS-2	Metal	M-F	46.95	42.72	37.56

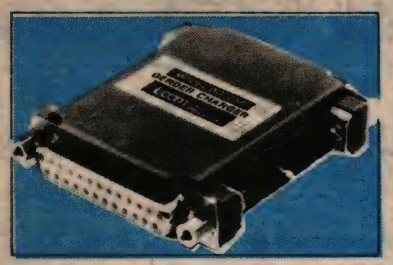
RS232 LINE PROTECTOR



RS-232 DATA LINE SURGE PROTECTORS Guard against lightning and electrical spikes entering the RS-232 ports. Metal-Oxide varistors on key signal lines act to clamp surges above 27 volts without affecting normal operation. This compact adaptor mounts permanently in series. All 25 lines are wired through. To be most effective Surge Protectors should be provided on both ends of a long line.

MODEL	Lines	1-9	10-24	25-99
DSPS-3	2,3 & 7	24.95	22.70	19.96
DSPS-4	2,3,7, & 20	26.95	24.52	21.56
DSPS-5	2,3,4,5,& 7	28.95	26.34	23.16
DSPS-7	2 thru 7 & 20	32.95	29.98	26.36

GENDER CHANGER



RS-232 GENDER CHANGERS - Are handy devices enabling the mating of wrong sex cables to equipment or to other cables. ABS encased or metalized to offer maximum shielding, will withstand extensive abuse. Four models fill most requirements.

MODEL	TYPE	GENDER	1-9	10-24	25-99
DG-25F	Std.	F-F	16.95	15.42	13.56
DG-25M	Std.	M-M	16.95	15.42	13.56
DGS-25F	Metalized	F-F	17.95	16.33	14.36
DGS-25M	Metalized	M-M	17.95	16.33	14.36

RS232 ADAPTOR KIT



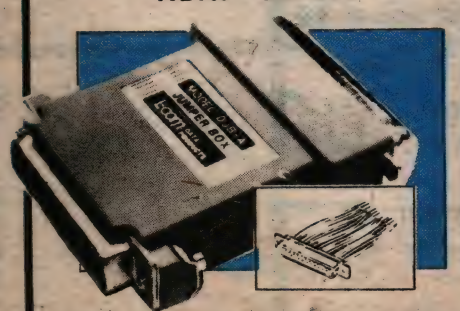
DO IT YOURSELF KIT - Allows the creation of many types of RS-232 adaptors. The following components are included in the assortments.

2 ea. 25 Pin D-Sub Connectors (see gender below)
2 ea. Snap-on half covers (UL 94VO)
1 set Hardware for each connector end

D-Sub connectors have solder cup terminations to accept wire leads. Choice of Plastic or Chrome Metal Housing.

MODEL	TYPE	GENDER	1-9	10-24	25-99
DIY	Std.	M-F	10.95	9.96	8.76
DIYS	Metal	M-F	12.45	11.33	9.96
DIYS-F	Metal	F-F	12.45	11.33	9.96
DIYS-M	Metal	M-M	12.45	11.33	9.96

SERIAL-PARALLEL ADAPTOR KIT



RS-232 TO CENTRONICS ADAPTOR KIT - Used to customize your own printer adaptors. The DB-25 has 25 flying leads, ready to be soldered to any of the 36 pin Centronics. Your choice of standard or metalized covers.

MODEL	TYPE	GENDER	1-9	10-24	25-99
DJBA	Std.	M-M	24.95	22.70	19.95
DJBA-2	Metalized	M-M	26.95	24.52	21.56

RS232 TEST ADAPTOR



A miniature **DATA TEST ADAPTOR** provides ready access to all 25 lines of the RS-232 interface. Only 2" x 2.5" x 0.5" in size. Has one male and one female connector for inline use. All 25 pins of each connector terminate to individual sockets which allow the two connectors to be interwired or jumped in any pattern. Comes complete with 20 jumper wires. Shielded Chrome Metal construction.

MODEL	TYPE	1-9	10-24	25-99
DTAS	Metal	29.95	27.25	23.96

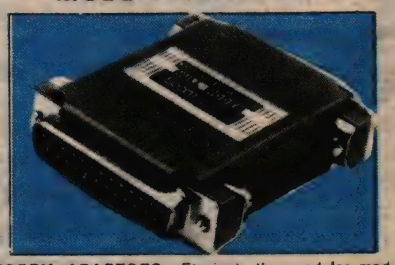
RS232 JUMPER BOX



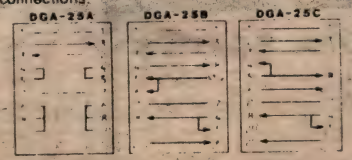
DATA JUMPER BOX - Used to customize RS-232 interface devices. All 25 pins of the D-Sub Connectors terminate to 25 solder pads. The PC Board layout makes it easy to wire your own adaptor. Supplied with 25 wires already stripped for permanent wiring. Many interfaces could be built, null modems, pin reversers, you name it. Supplied with PC Board already soldered in place. Snap-on Chrome Metal covers and appropriate hardware are unassembled. Your choice of genders.

MODEL	TYPE	GENDER	1-9	10-24	25-99
DJBS	Metal	M-F	21.95	19.97	17.56
DJBS-F	Metal	F-F	21.95	19.97	17.56
DJBS-M	Metal	M-M	21.95	19.97	17.56

MODEM ADAPTOR



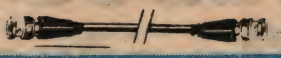
MODEM ADAPTORS - Eliminate the need for modems when connecting local terminals together or terminals to computer. Circuit codes are shown to identify pin connections.



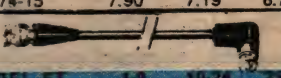
MODEL	TYPE	GENDER	1-9	10-24	25-99
DGA-25A	Std.	M-F	16.95	15.42	13.56
DGA-25B	Std.	M-F	16.95	15.42	13.56
DGA-25C	Std.	M-F	16.95	15.42	13.56

Ask us to quote on Custom RS232 Adapters

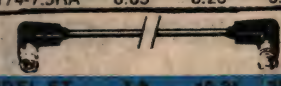
COAXIAL CABLES



MODEL-FT	1-9	10-24	25-99
CC58C-1	3.55	3.23	3.05
CC58C-1.5	3.70	3.37	3.18
CC58C-2	3.85	3.50	3.31
CC58C-2.5	4.10	3.73	3.53
CC58C-4	4.40	4.00	3.78
CC58C-5	4.35	4.23	4.00
CC58C-10	6.05	5.51	5.20
CC58C-15	7.45	6.78	6.41
CC58C-25	10.75	9.33	9.25
CC59B-1	3.65	3.32	3.14
CC59B-2.5	4.00	3.64	3.44
CC59B-5	4.75	4.32	4.09
CC59B-10	6.25	5.69	5.38
CC59B-15	7.75	7.05	6.67
CC59B-25	10.75	9.78	9.25
CC59B-50	18.25	16.61	15.70
CC59B-100	33.25	30.26	28.60
CC62A-1	3.60	3.28	3.10
CC62A-2.5	3.95	3.59	3.40
CC62A-5	4.70	4.28	4.04
CC62A-10	6.15	5.60	5.29
CC62A-15	7.60	6.92	6.54
CC62A-25	10.50	9.56	9.03
CC62A-50	17.75	16.15	15.27
CC62A-100	32.25	29.35	27.74
CC174-1	3.60	3.28	3.10
CC174-1.5	3.75	3.41	3.23
CC174-2	3.90	3.55	3.35
CC174-2.5	4.05	3.69	3.48
CC174-4	4.50	4.10	3.87
CC174-5	4.80	4.37	4.13
CC174-10	6.35	5.78	5.46
CC174-15	7.90	7.19	6.79



MODEL-FT	1-9	10-24	25-99
CC58C-1RA	4.90	4.46	4.21
CC58C-1.5RA	5.05	4.60	4.34
CC58C-2RA	5.20	4.73	4.47
CC58C-2.5RA	5.35	4.87	4.60
CC58C-3RA	5.50	5.00	4.73
CC58C-4RA	5.80	5.28	4.99
CC58C-5RA	6.10	5.55	5.25
CC58C-7.5RA	6.85	6.23	5.89
CC58C-10RA	7.60	6.92	6.54
CC59B-1RA	4.90	4.46	4.21
CC59B-1.5RA	5.05	4.60	4.34
CC59B-2RA	5.20	4.73	4.47
CC59B-2.5RA	5.35	4.87	4.60
CC59B-3RA	5.50	5.00	4.73
CC59B-4RA	5.80	5.28	4.99
CC59B-5RA	6.10	5.55	5.25
CC59B-7.5RA	6.85	6.23	5.89
CC59B-10RA	7.60	6.92	6.54
CC62A-1RA	4.90	4.46	4.21
CC62A-1.5RA	5.05	4.60	4.34
CC62A-2RA	5.20	4.73	4.47
CC62A-2.5RA	5.35	4.87	4.60
CC62A-3RA	5.50	5.00	4.73
CC62A-4RA	5.80	5.28	4.99
CC62A-5RA	6.10	5.55	5.25
CC62A-7.5RA	6.85	6.23	5.89
CC62A-10RA	7.60	6.92	6.54
CC174-1RA	4.90	4.46	4.21
CC174-1.5RA	5.05	4.60	4.34
CC174-2RA	5.20	4.73	4.47
CC174-2.5RA	5.35	4.87	4.60
CC174-3RA	5.50	5.00	4.73
CC174-4RA	5.80	5.28	4.99
CC174-5RA	6.10	5.55	5.25
CC174-7.5RA	6.85	6.23	5.89



MODEL-FT	1-9	10-24	25-99
CC58C-1RA2	6.25	5.69	5.38
CC58C-1.5RA2	6.40	5.82	5.50
CC58C-2RA2	6.55	5.96	5.63
CC58C-2.5RA2	6.70	6.10	5.76
CC58C-3RA2	6.85	6.23	5.89
CC58C-4RA2	7.15	6.51	6.15
CC58C-5RA2	7.45	6.78	6.41
CC58C-7.5RA2	8.20	7.46	7.05
CC58C-10RA2	8.95	8.14	7.70
CC59B-1RA2	6.25	5.69	5.38
CC59B-1.5RA2	6.40	5.82	5.50
CC59B-2RA2	6.55	5.96	5.63
CC59B-2.5RA2	6.70	6.10	5.76
CC59B-3RA2	6.85	6.23	5.89
CC59B-4RA2	7.15	6.51	6.15
CC59B-5RA2	7.45	6.78	6.41
CC59B-7.5RA2	8.20	7.46	7.05
CC59B-10RA2	8.95	8.14	7.70
CC62A-1RA2	6.25	5.69	5.38
CC62A-1.5RA2	6.40	5.82	5.50
CC62A-2RA2	6.55	5.96	5.63
CC62A-2.5RA2	6.70	6.10	5.76
CC62A-3RA2	6.85	6.23	5.89
CC62A-4RA2	7.15	6.51	6.15
CC62A-5RA2	7.45	6.78	6.41
CC62A-7.5RA2	8.20	7.46	7.05
CC62A-10RA2	8.95	8.14	7.70
CC174-1RA2	6.25	5.69	5.38
CC174-1.5RA2	6.40	5.82	5.50
CC174-2RA2	6.55	5.96	5.63
CC174-2.5RA2	6.70	6.10	5.76
CC174-3RA2	6.85	6.23	5.89
CC174-4RA2	7.15	6.51	6.15
CC174-5RA2	7.45	6.78	6.41
CC174-7.5RA2	8.20	7.46	7.05

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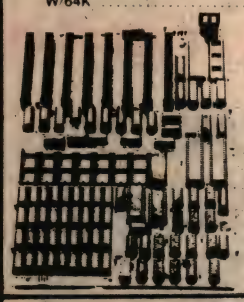
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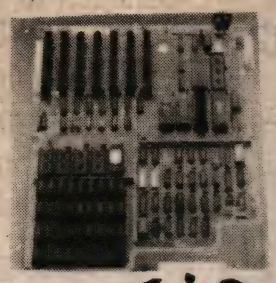
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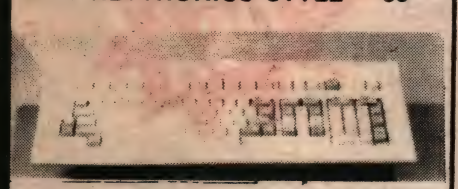
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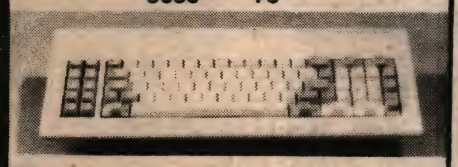
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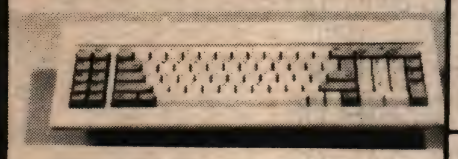
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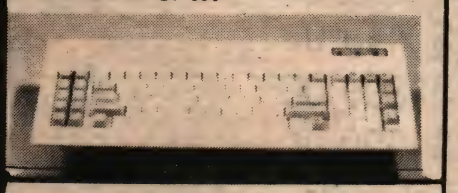
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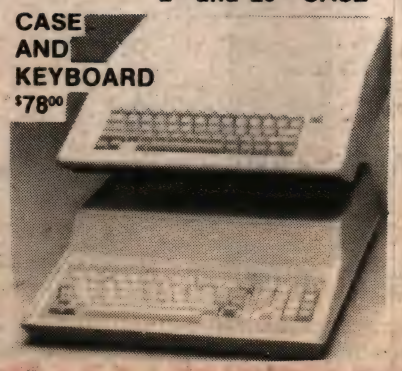
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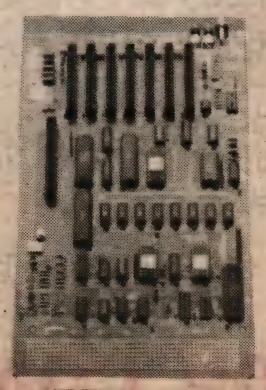


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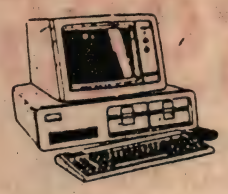
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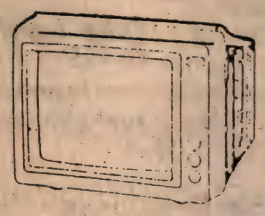
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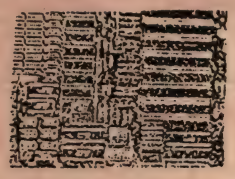
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8253	1	74LS245	4
8259	1	74LS27	1
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Digitals 74 S/s		74LS02	2
		74LS04	3
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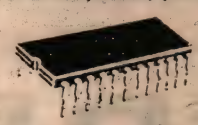
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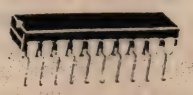
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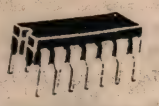


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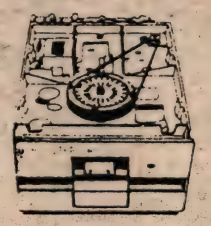
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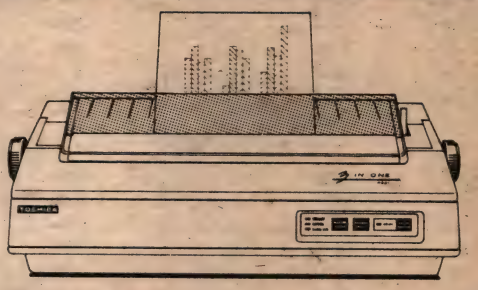
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▶**Samna** *Samna III Word Processor*	227.00*
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Tallgrass *25MB External/Hard Disk with 60MB Tape Backup*	2,375.00*	*(51.30)*
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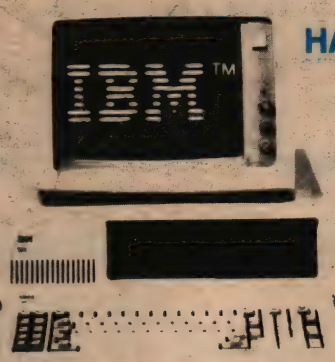
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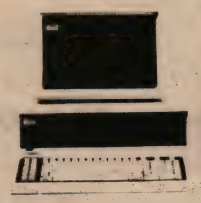
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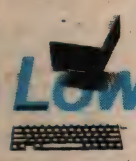


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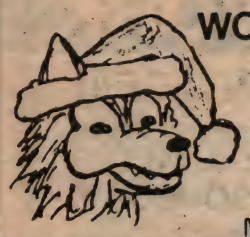
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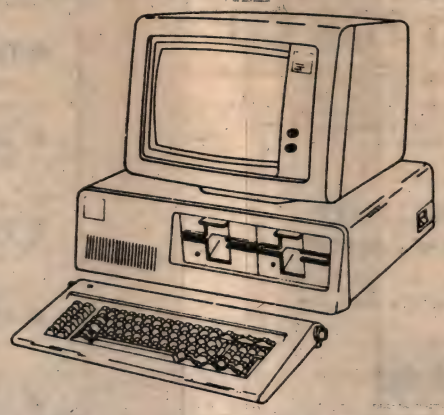
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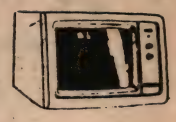
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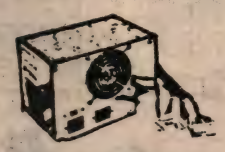
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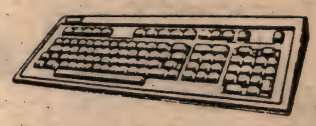
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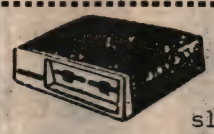


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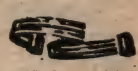


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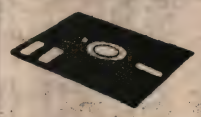


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PAPERBACK SOFTWARE, INC.



NumberWorks.....$39.95
Executive Writer.....$69.95
Paperback Writer.....$39.95
My ABC's (3-7 yrs).....$19.95
Draw It.....$29.95
Executive Filer.....$49.95
Paperback Speller.....$39.95
VP-planner.....$99.95

DAC SOFTWARE, INC.

DAC Easy Accounting...(7 powerful, integrated packages).....$69.95

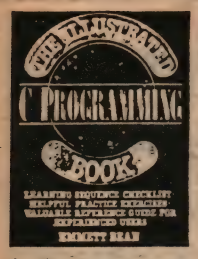
DATADISK

96TPI drive software...(run 96 track drives).....$39.00

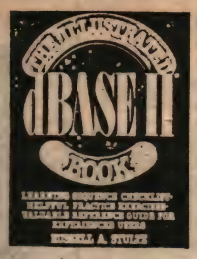
HYPERGRAPHICS CORPORATION

Ole On-Line Encyclopedia for DOS Users.....$69.95
(throw away your manual...great for learning...better for resident on-line reference)

Ole BASIC (combination tutorial and reference system).....$69.95









WOLFF COMPUTER IS VERY PROUD TO ANNOUNCE THAT WE ARE NOW CARRYING BOOKS BY PLANO'S OWN COMPUTER PUBLISHING HOUSE: WORDWARE PUBLISHING, INC.!!!

MS/PC DOS..dBASE..SYMPHONY..LOTUS..MULTIMATE..C PROGRAMMING..pfs..UNIX

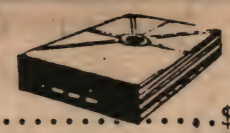
These books are clear, concise, easy-to-follow instructional guides that are great for the beginner or pro. And of course, WOLFF COMPUTER offers them below retail bookstore prices!

DO YOU HAVE AN UNUSED COMPUTER GATHERING DUST IN THE CLOSET?

WOULDN'T IT BE NICE TO TRADE UP TO A FULLY COMPATIBLE SYSTEM?

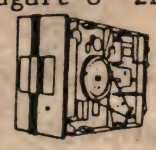
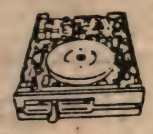
REMEMBER! WE STILL BUY, SELL AND TRADE USED EQUIPMENT.

Our USED EQUIPMENT listing will return next month. We still have equipment for sale, and as always conditions and guarantees vary, and all equipment is sold on a first come basis.



DISK DRIVES: NEW:

Qume half-height DS	$ 59.95
Shugart 455 96TPI DS	$ 99.00
Shugart 465 96TPI DS	$109.00
10 Meg half-height HD	$279.00
20 Meg half-height HD	$425.00
10 Meg Shugart 8" 220V/50Hz	$ 75.00

DISK DRIVES: USED/SURPLUS:

5¼ Tandon full-height SS	$ 29.00
5¼ half-height floppy SS	$ 49.00
5¼ full-height floppy DS	$ 59.00
5¼ half-height floppy DS	$ 69.00
8" MFE DS	$ 69.00
10 Meg full-height 5¼ HD	$275.00
15 Meg full-height 5¼ HD	$325.00
20 Meg full-height 5¼ HD	$375.00

RESISTORS / CAPACITORS / SWITCHES / TERMINAL BLOCKS / PARTS / COMPONENTS



5" muffin fan 120V AC
(deinstalled equipment)

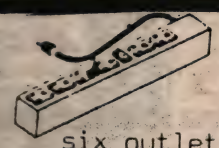
$4.95

VOLTAGE REGULATORS

7805T = 5V
7812T = 12V
7815T = 15V
7824T = 24V

45¢





$14.95

six outlet

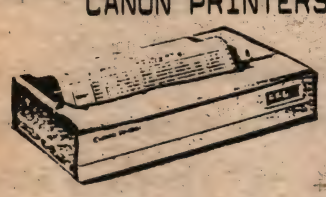
AC SURGE SUPPRESSOR

RAM CHIPS



64K 150ns	9/ 6.49	$ .99/ea
128K	9/36.49	$4.99/ea
256K	9/32.00	$3.49/ea

CANON PRINTERS!



Mdl 1080A (80 col)	$219.00
Mdl 1156A (wide carriage)	$349.00

* 160 cps
* self-test mode
* parallel interface
* near letter quality (27 cps)
* friction or sprocket feed
* bi-directional printing (2K buffer)
* full Epson character set, including graphics

NEW AND STILL IN TIME FOR CHRISTMAS!
MOVIT, THE UNIQUE DO-IT-YOURSELF ROBOT KITS!

TURN BACKER	sound sensor	34.95
AVOIDER	infra-red	39.95
LINE TRACER	infra-red	34.95
PIPER MOUSE	sound sensor	39.95
PEPPY	sound/touch	21.95
SOUND SKIPPER	sound activated	21.95
MR. BOOTSMAN	wired control	29.95
CIRCULAR	remote control	62.95
S-CARGO	sound sensor	34.95
NAVIUS	programmable disc	44.95
MEDUSA	sound activated	24.95
WAO	programmable conditional calls sub-routines, written graphics	89.95




POWER SUPPLIES:



Fox AC adaptor
input 117V AC
output 12V AC 600 ma
.....

Atari power supply modules
output is 9V @ 150 ma
.....$2.50



18V AC supply 4½ x 4 x 1
+ 5V @ 1.2A
+12V @ .5A
- 5V @ .3A
.....$4.95

Scrap 18 x 5½ x 7 powerhouse
+5V & +12V includes:
fan, AC & DC breakers,
voltage adj. pots
.....$6.00

Astec supply 6½ x 5½ x 4
input voltages: 115/230V AC
+ 5V @ 6A
+ 9V @ 1.5A
+12V @ 2A
+17V @ 1.5A
+34V @ 2.25A
complete with cooling fan!
.....$29.00

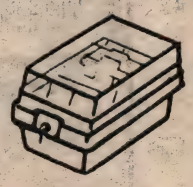
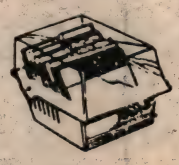


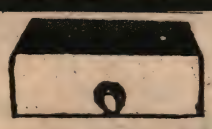
DC power supply
+ 5V @ 5A
+12V @ 2.8A
-12V @ 2.5A
.....$29.00

Diskdrive supply
+ 5V @ 4A
+12V @ .8A
-12V @ 8A
-12V @ .3A
.....$24.95

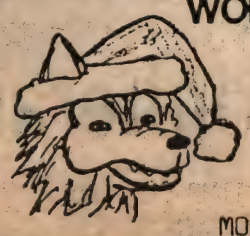


Signalman Mark XII modem	$299.00
Diskette storage boxes...75 unit	$ 8.49
..100 unit	$ 13.49
diskettes (box of 10)	$ 10.00
disposable head cleaner diskettes (10/pkg)	$ 9.95
8" drive case kits	$ 39.00
numeric keypads w/serial output	$ 4.25
empty modem boxes (10 x 8½ x 3)	$ 2.95
3-prong AC cables for PC-monitor	$ 1.89
fuse/switch assemblies w/3-prong AC plug	$ 1.50
edge connectors bus 100 connectors	$ 2.00
86 pin connectors	$ .75
70 pin connectors	$ 1.60
terminal strips: 4,6,8,10,12,15 position	$ .59
rubber feet...4/strip	$ .49
RS232 25 pin, 6 foot extension cable	$ 11.95

AB SWITCH BOXES
$39.00
RS-232
serial & parallel



WOLFF COMPUTER & ELECTRONICS

(214) 423-8097

901 E. Plano Pkwy #117
Plano, Texas 75074

MON-FRI 10am to 7pm SAT 10am to 6pm

- Prices DO NOT include shipping
- VISA & MasterCard add 3%
- COD's add $1.90
- Checks accepted, allow 10 days to clear
- Dallas MTA add 6 1/8%
- Other Texas residents add 5 1/8%
- Prices subject to change without notice
- We reserve the right to limit quantities

VISA
master charge
AMERICAN EXPRESS

American XT



American XT Personal Computer

American XT Computer System Unit

Highlights Include:

- 256KB user or random access memory (RAM) standard...expandable up to 1MB on the system board (640KB DOS accessable).
- 8KB permanent or read only memory (ROM). which contains the BIOS and 56KB user usable.
- High-performance. high-speed. 16-bit 8088 microprocessor.
- Eight expansion slots that allow easy system expansion by using optional plug-in adapters.
- Two 360KB slim line diskette drives to support single-sided or double-sided. double-density. 5¼ inch diskettes.
- Optional 10MB or 20MB fixed disk drive.
- 135W power supply 110V/220V switchable.
- Four layer mother board to increase system reliability.
- Speaker for audio and music applications.
- Power-on automatic self-testing of system components.

Keyboard

American XT computer comes with a slim. lightweight keyboard. It features:

- An 84-key. typewriter-like format to help make it easy to learn and operate the system.
- A six-foot coiled cable that allows convenient movement of the keyboard.
- Power. caps-lock and num-lock LED indicators.
- A 10-digit. calculator-like numeric keypad for entering numbers quickly and easily.
- 10 special function keys to save time in activating commonly repeated tasks.
- A special "print screen" key that enables you to print out anything that appears on your display screen at any time.
- Typing angle can be adjusted to suit your working position.
- Optional enhanced keyboard with separated cursor and numeric keypad.

Hardware Specifications:

Size: width – 20". depth – 16". height – 5.5".
Weight: without diskette drive – 21 lbs: with two drives – 28 lbs: with hard disk – 33 lbs.
User Memory: cycle time – 410 nanoseconds: access time – 250 nanoseconds.
Environment: air temperature – 60°F to 90°F system ON. 50°F to 110°F system OFF: humidity – 8% to 80% system ON. 8% to 80% system OFF: noise levels-59dB (without printer): electrical – 120V/220V AC. 60/50 cycles. 200 watts.

Software.

Runs all the popular programs written for the IBM PC/XT using the MS-DOS version 2 operating system.

System Specifications:

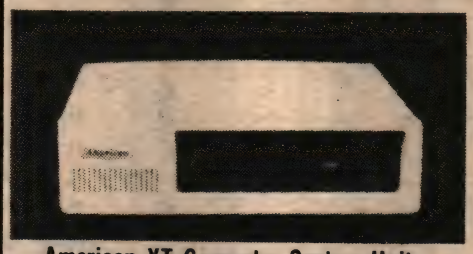
- **Model 1, Basic System.**
  256K bytes random-access memory (RAM).
- **Model 2, Office System.**
  256K bytes random-access memory (RAM).
  Two diskette drives with controller.
  Color graphics card or monochrome card.
- **Model 3, Business System.**
  640K bytes random-access memory (RAM).
  Two diskette drives with controller.
  I/O plus with serial. parallel. game port and battery backup real time clock.
  Color graphics card or monochrome card.
- **Model 4, Professional System.**
  All the features of model 3 plus a 10MB fixed disk drive.
- **Model 5, Executive System.**
  All the features of model 3 plus a 20MB fixed disk drive.

Introducing the most

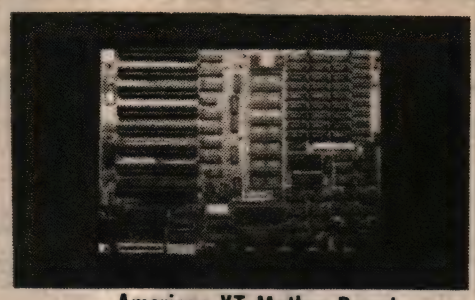
COMPATIBLE & AFFORDABLE

Desktop Computer American XT/AT

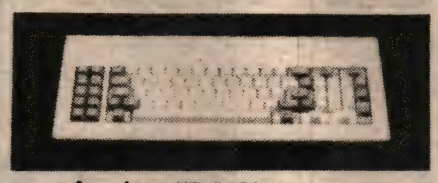
The Perfect Solution



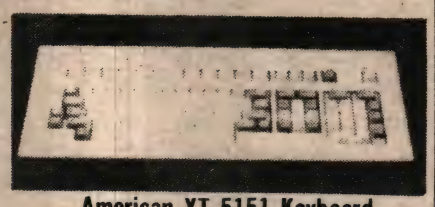
American XT Computer System Unit



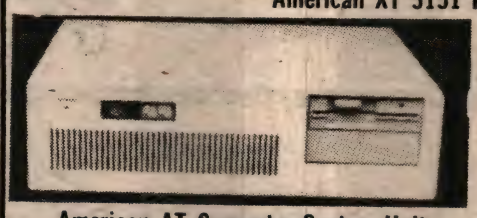
American XT Mother Board



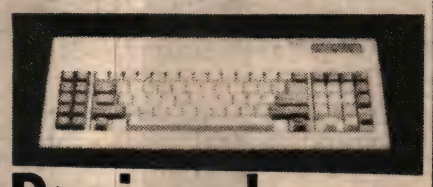
American XT 5150 Keyboard



American XT 5151 Keyboard



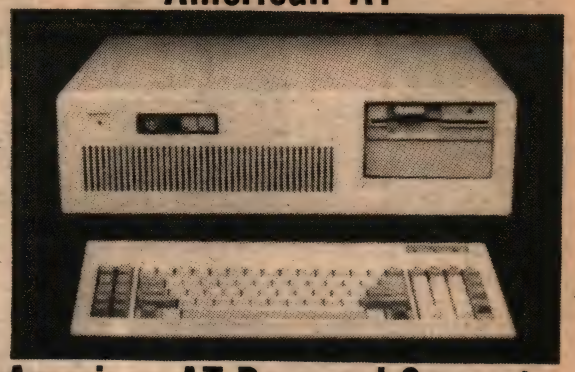
American AT Computer System Unit



Regional Distributors & OEM Inquiries Welcome

Manufactured by:

American AT



American AT Personal Computer

American AT Computer System Unit

Highlights Include:

- 512KB user or random access memory (RAM) standard...expandable up to 4MB by adding memory feature cards.
- 64KB permanent or read only memory (ROM). which contains the BIOS.
- High-performance. high-speed. true 16 bit 80286 microprocessor.
- Eight expansion slots that allow easy system expansion by using optional plug-in adapters.
- 1.2M high capacity disk drive to support 5¼ inch diskette.
- 200 watts power supply 110/220V switchable.
- Battery backup for CMOS configuration table and real-time clock.
- 7-channel direct memory access (DMA).
- 16-level interrupt.
- Three programmable timers.
- Speaker for audio and music applications.
- Power-on automatic self-testing of system components.

Keyboard

American AT computer comes with a slim. lightweight keyboard. If features:

- An 84-key. typewriter-like format to help make it easy to learn and operate the system.
- A six-foot coiled cable that allows convenient movement of the keyboard.
- Cap-lock. num-lock and scroll-lock LED indicators.
- A 10-digit. calculator-like numeric keypad for entering numbers quickly and easily.
- 10 special function keys to save time in activating commonly repeated tasks.
- A special "print screen" key that enables you to print out anything that appears on your display screen at any time.
- Typing angle can be adjusted to suit your working position.

Hardware Specifications:

Size: width – 21.3". depth – 17.3". height – 6.8"
Weight: without diskette drive – 33 lbs.: with one drive – 37 lbs.: with hard disk – 42 lbs.
User Memory: cycle time – 275 nanoseconds: access time – 150 nanoseconds.
Environment: air temperature – 60°F to 90°F system ON. 50°F to 110°F system OFF: humidity – 8% to 80% system ON. 8% to 80% system OFF: noise levels-59dB (without printer): electrical – 120V/220V AC. 60/50 cycles. 300 watts.

Software.

Runs all the popular programs written for the IBM PC/XT using the MS-DOS version 3 operating system.

System Specifications:

- **Model 1, Basic System.**
  [ ] 512K bytes random-access memory (RAM).
- **Model 2, Office System.**
  [ ] 512K bytes random-access memory (RAM).
  [ ] One diskette drive with controller.
  [ ] Color graphics card or monochrome card.
- **Model 3, Business System**
  [ ] 512K bytes random-access memory (RAM).
  [ ] One diskette drive with controller.
  [ ] Serial/Parallel interface card.
  [ ] Color graphics card or monochrome card.
- **Model 4, Professional System.**
  [ ] All the features of Model 3 plus a 20MB fixed disk drive.
- **Model 5, Executive System.**
  [ ] All the features of Model 3 plus a 40MB fixed disk drive.

American Computer & Peripherals, Inc.

2134 S. Ritchey St., Santa Ana, CA 92705
Tel: (714) 545-2004 - Sales (714) 545-2098 Service

American ADD-ON

American Color Graphics Card

- Use state-of-the art technology GATE ARRAY LOGIC to increase reliability and reduce cost.
- RGB and composite outputs with 640 x 200 pels compatible to IBM standard.
- Light pen and RF modulator interface standard.

American Monochrome Card

- Use state-of-the-art technology GATE ARRAY CHIP to increase reliability and reduce cost.
- TTL output 720 x 350 pels with 25 lines x 80 column compatible to IBM standard.
- Built-in parallel printer port.

Floppy Controller Card

- Can control up to 4 drives.

Monochrome Graphics Card

- TTL Output 720 x 350 pels with 25 lines x 80 column for text mode.
- 720 x 348 pels in Graphics mode compatible to Hercules card.
- Built in parallel printer port.

I/O Plus Card

- Serial, parallel, game ports and real time clock.
- 2nd serial port optional.

Multifunction Card

- 384K RAM Sockets.
- serial, parallel, game ports and real time clock.
- With RAM Disk and PSPOOL software.

Hard Disk Controller Card

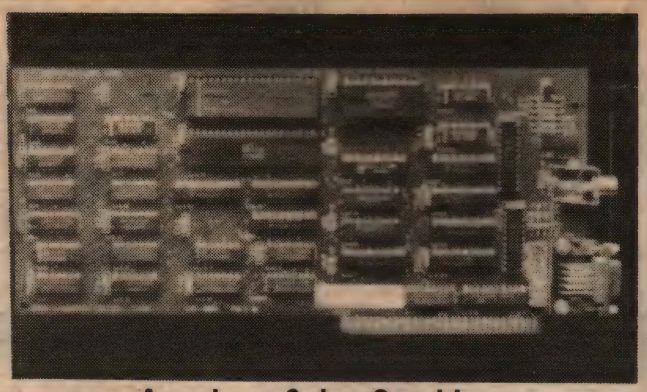
- Control up to 2-20M hard disk

Serial/Parallel for AT

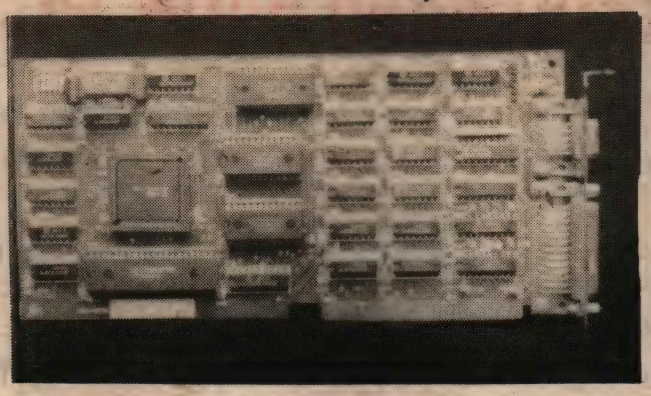
- Serial and Parallel Interface card for AT.

Controller Card for AT

- Control 2-1.2M floppy disk drives.
- Control 2-20/40M hard disk drives.



American Color Graphics



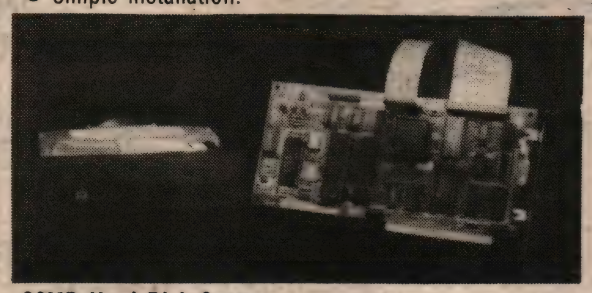
American Monochrome

American HD

American Hard Disk System

10MB Hard Disk System:

- Formatted and tested.
- Slim line hard disk with controller card.
- Simple installation.



20MB Hard Disk System:

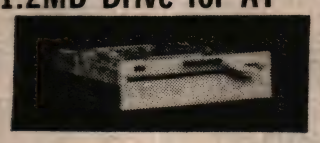
- Formatted and tested.
- Full size panel with controller card.
- Simple installation.

20MB Hard Disk for AT

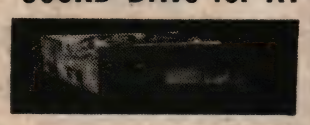




1.2MB Drive for AT

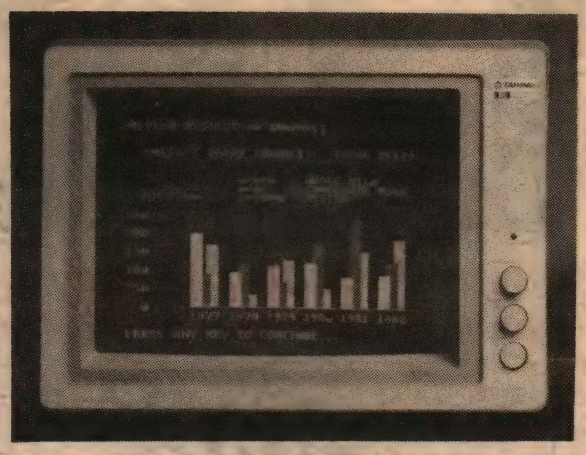


360KB Drive for AT



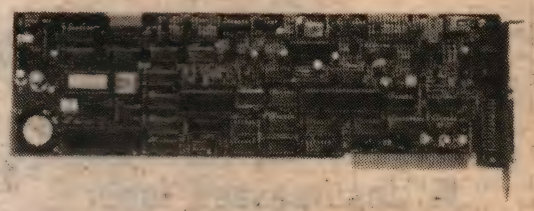
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American Monitor



CM-1322

- 13" RGBI color monitor for separate TTL-signal-output personal computer.
- High performance 16 color display, fully compatible with IBM.
- Switching mode power supply for wide range power input low power dissipation.
- Lock type controls on front-panel.
- Dark tinted CRT.



American Modem

American Modem 1200B

- Free PC-Talk Software
- Additional RS232 Serial Port Included.
- Voice and Data jacks with keyboard switching.
- Intelligent-Adaptive-Auto Speed Dial.
- 300/1200 Baud Bell 103/212A.
- Self test at power up.
- Auto redial on busy.
- Call progress monitoring.
- Fully Hayes compatible with enhanced features.

American PS

- 130W/150W Power Supply for IBM PC upgrade. Same dimension as IBM PC.
- 200W Power supply for AT system. Same dimension at IBM AT PS.

American XT/AT Personal Computers & Peripherals Are Distributed by:

P.C. Land, Inc.
Tustin, Calif. (714) 730-6723
PC System Design
Pasadena, CA (818) 792-8889
Ascot Engineering, Inc.
Edmonton, Canada (403) 438-0994
Micro Configuration East, Inc.
Brooklyn, NY (718) 941-2512
Custom Technology
Houston, TX (713) 868-2835
ITM Company
Dedham, Mass (617) 329-5799
CTXT (800) USA-CTXT
Chatzworth, CA (818) 998-6777
Computer Peripheral Warehouse, Inc.
Deerfield Bch., FL (305) 481-2170
(800) 251-2170
RGB Computing
Glendale, CA (818) 240-0422
Analytical Systems Co.
Raleigh, NC (919) 851-8000
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Aurora, CO (303) 699-0468
Caltronics
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A fully IBM compatible 640K PC for $999.00?

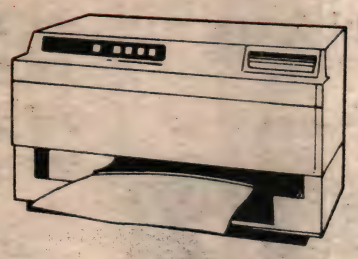
ANSWER



- Compatible with all standard software that works on an IBM PC/XT . . . runs PC DOS!
- Monochrome monitor, video board.
- AT keyboard
- Dual 5¼" floppy drives

Canon LASER PRINTER

- 8 pages per minute
- Parallel Diablo 630 emulation
- Unsurpassed letter quality
- Super quiet, ideal in the office environment



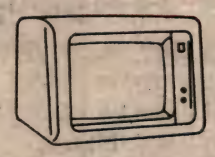
$2195.00

FONT CARTRIDGES
From 7.5 to 16 point ..... $209.49 ea

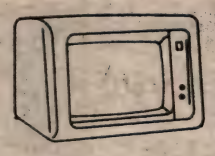
TONER CARTRIDGES
For Canon/Hewlett Packard ..... $89.49 ea

MONITORS

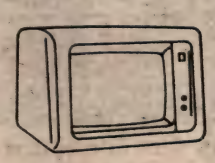
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SAMSUNG high resolution COLOR monitor
■ 14" screen ■ RGB/TTL ■ 2000 character display capacity ■ Brightness and contrast controls
$149.00



SAMSUNG monochrome monitor
■ 12" screen ■ High resolution (800 lines at center)
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Order now . . . quantities are very limited.

WE STOCK HUNDREDS OF MICROCOMPUTER ACCESSORIES!!

ROLLTOPS



Classic Rolltop design holds 120 5 1/4" or 55 3 1/5" disks. Many color choices.
5¼" model (retails for $36.00) ONLY $24.99
3½" model (retails for $24.95) ONLY $17.49

THE ORIGINAL TILT'N TURN



Super rugged model fits CRT's with feet seperation of up to 12" x 12" (retails for $29.95)
ONLY $19.95

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Save desk space with "top of the line" expandable/ retractable arm. Wall, desk or flange mount. (retails for $129.95)
ONLY $78.00

AND MORE!!!

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with Lock	$61.95
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FOR IBM PC'S AND PC COMPATIBLES

Magnis 6-pack multifunction card with 384K	$139.00
Magnis memory card with 348K	$95.00
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Smarteam internal modem (1200 BPS), fully Hayes compatible	$198.00
Smarteam external modem (1200 BPS), fully Hayes compatible	$198.00

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...AND SAVE!

DISKETTES

3M

	50+	100+
5¼" DS/DD	$1.59	$1.49

MEMOREX

5¼" SS/DD	$ .99	$ .95
5¼" DS/DD	$1.49	$1.39

maxell

3½" SS	$1.99	$1.95
5¼" SS/DD	$1.25	$1.19
5¼" DS/DD	$1.65	$1.59

RIBBONS

Available in sixes

Epson MX-70/80	$2.59 ea
Epson MX-100	$3.99 ea
Okidata Micro 801/ 82A/83A/92/93	$1.29 ea
Okidata Micro 84/94	$2.90 ea
Diablo Hypype II	$3.19 ea
NEC Spinwriter	$5.29 ea
C. Itoh Prowriter	$3.69 ea
Epson LQ 1500	$4.99 ea
Epson LX 80	$4.99 ea
Okidata 192/82	$5.99 ea

APPLE IMAGEWRITERS

Black	$3.45 ea
Color 6-Pack (red, green, blue, yellow, purple, brown)	$4.75 ea

3M DATA CARTRIDGES

DC600A	$20.50
DC100A	$12.20
DC300A	$14.05

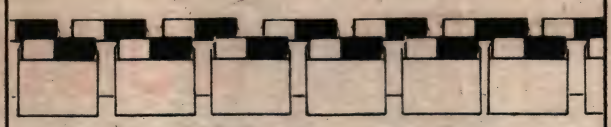
Price is for each, packed in fives.

Nashua™



Boxed in tens with envelopes, labels and write protect tabs, and Nashua's limited lifetime warranty.

	20+	50+	100+
3½" SS	$1.75	$1.69	$1.59
5¼" SS/DD		$ .84	$ .79
5¼" DS/DD		$ .89	$ .84
5¼" DS/HD		$2.14	$2.09



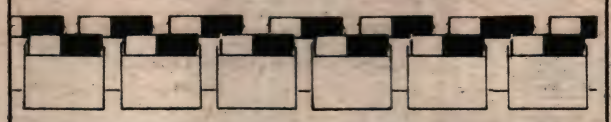
Poly-bagged in fifties, with envelopes. Available in increments of 250.

	250+	500+
5¼" SS/DD	54¢	53¢
5¼" DS/DD	68¢	64¢
8" DS/DD	$1.99	$1.85

BASF

Boxed in tens with envelopes, write protect tabs and labels.

	50+	100+
5¼" DS/DD	99¢	95¢



Poly-bagged in increments of 150, with tyvek envelopes, labels and write protect tabs.

	150+	300+	600+
5¼" SS/DD	59¢	56¢	54¢
5¼" DS/DD	69¢	66¢	64¢

SPECIAL

3½" SS DISKS $1.39 each

These are "factory-fresh" 3½" disks in quantities of 100 from THE major West Coast manufacturer of well recognized brand name diskettes. Order now . . . quantities are very limited

SONY VALU PAC

3½" SS DISKS



Boxed in fifties

$1.60 ea., qty. 100 $1.64 ea., qty. 50

SONY



Boxed diskettes from the inventor of the 3½" drive.

	20+	50+	100+
3½" SS	$1.95	$1.89	$1.85
3½" DS	$3.09	$2.99	$2.95
5¼" DS/DD		$1.29	$1.25
5¼" DS/HD		$2.99	$2.95

SONY



GIVES YOU A



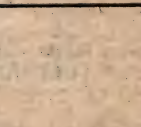
FREE 3½" head cleaning kit with every 100 3½" SS disks you buy



FREE 3½" rolltop file with every 50 3½" DS disks you buy



FREE 5¼" rolltop with every 50 5¼" DS/HD disks you buy.



FREE 5¼" rolltop with every 100 5¼" DS/DD disks you buy.

ORDERING INFORMATION

7 to 7 Central time
10 to 3 Saturdays

Shipping/handling additional. Minimum order $50.00 Visa, MasterCard and Prepaid orders accepted. Corporations rated 3A2 or better and government accounts are accepted on a net 30 basis C.O.D. orders add an additional $5.00 special handling charge. APO, FPO, AK, HI & PR orders add an additional 5% to the total order amount to cover PAL and insurance. No sales tax outside of Illinois.

1 800 USA FLEX

IN ILLINOIS 1 (312) 351-9700 OR 1-800-FOR-FLEX

GET DISK-ORGANIZED

WITH THE NEW WS/DOS DISK-ORGANIZER SYSTEM

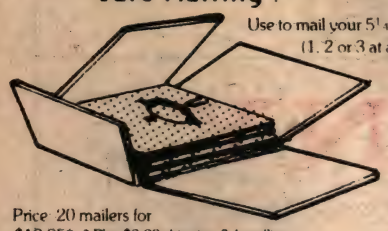
The System that enables you to organize, and transport your vital data.

FREE BONUS OFFER!



With your order of $59.00 or more you will receive a **FREE** Disk Easel/Copyholder.

New Disk Mailers
Safe Mailing!



Price: 20 mailers for $12.95* * Plus $3.00 shipping & handling



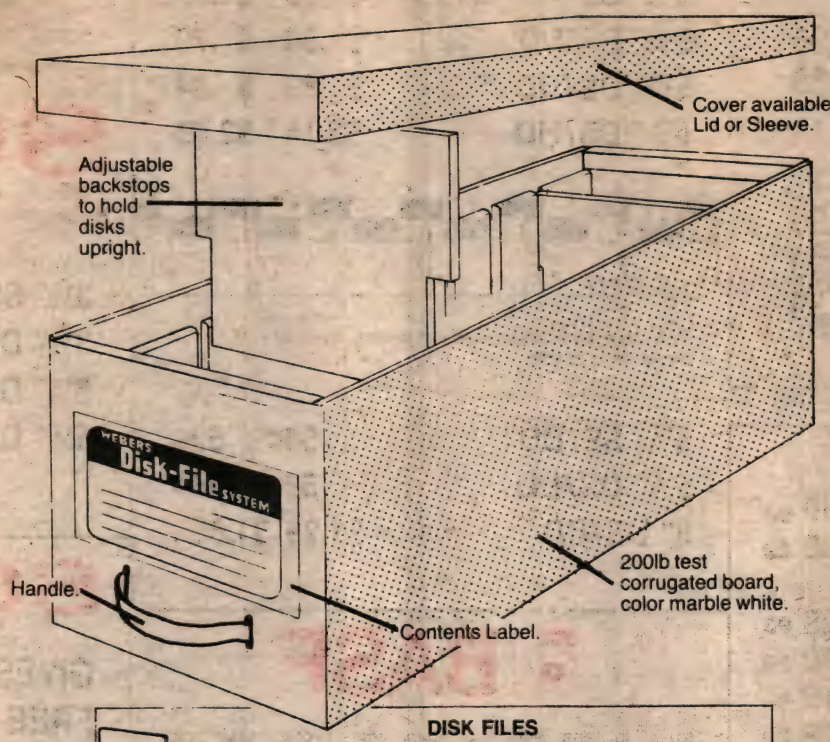
The Problem:
As you may have discovered, floppy disks are kind of like rabbits . . . you start with two and before you know it, you have them everywhere! Then, your problem is to keep all those disks organized so you can find the ones you need — without mess, fuss or wasted time.

The Solution to the problem:
for you, can be the new Weber & Sons' Disk Organizing System . . . or, **WS/DOS,** for short. This is a system you use next to your computer. It includes: a disk file to hold about 150 disks, a color code system that's easy to remember (because it's like the color of a traffic light), disk labels, disk jackets (in colors) and clear plastic pockets you affix to your disk jackets to help you identify the contents of all your disks — *fast.*

In Short, It's a System
that is easy to use, fast to set up, efficient and reasonably priced. **WS/DOS** can be yours *in a kit* — so you'll have everything you need to organize your disks in one convenient package, or as just the items you may need to fill your immediate needs.

For more information or to place your order, call us today — **TOLL FREE at 1-800-225-0044.** (in N.J. call: 201-431-1128).

WS/DOS-DISK-KIT, Sr.
One size 5.25-D Disk-File (holds 150 5¼" disks), your choice of lid or pull-drawer sleeve, 100 KangarooPockettes with color code inserts, 50 color code disk jackets, 120 large 1" x 3½" color code disk labels, 120 small ⅜" x 1" color code disk labels, and one Disk Easel/Copyholder — holds eight disks for easy viewing or use it as a copyholder when typing. **All for only $59.95**





NEW **Stackable Files**

WS/DOS DISK-KIT, Jr.
One size 5.25 DS disk file (holds 75 5¼" disks), 25 KangarooPockettes with color coded inserts, 25 color coded disk jackets, 120 large 1" x 3½" color code disk labels, 120 small ⅜" x 1" color code disk labels, and one handy Disk Easel/Copyholder — it holds eight disks for easy viewing or use it as a copyholder.
All for only $39.95

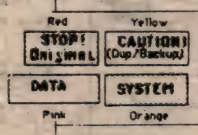
DISK FILES



Cat.#	Capacity	Outside Dimensions L	W	H	Price*
3.5D	90-100	14¼"	5¾"	4¾"	$ 9.95
5.25-DS	75	8"	7¼"	6¼"	$ 8.95
5.25-D	150	16"	7¼"	6¼"	$10.95
8-D	150	16"	10"	9"	$16.95

Note: Your choice of LID or SLEEVE sizes: 5.25-D & 8-D
Other sizes available, please call for information.
(Made of 200# Test Corrugated. Color: Marble White)

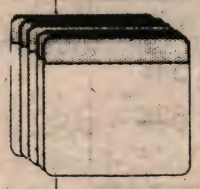
COLOR CODED DISK LABELS*



Cat.#	Size	Qty./Pkg	Price*
CCDL-138	⅜" x 1"	120	$4.50
CCDL-14	1" x 3½"	120	$6.80

† Red, Yellow, Green, Orange, Pink

DISK JACKETS (5¼")



White (Tyvek) Cat#	Qty./Pkg.	Price*	Colors † Cat#	Qty./Pkg.	Price*
DJW-5	25	$ 6.80	DJCC-5	25	$ 7.95
DJW-5	50	$13.30	DJCC-5	50	$13.95
DJW-5	75	$19.60	DJCC-5	75	$19.95
DJW-5	100	$25.50	DJCC-5	100	$26.95

† Red, Yellow, Green, Orange, Pink

*Plus Shipping and Handling Charges.

KangarooPockettes



With WHITE Inserts Cat#	Qty./Pkg.	Price*	With COLOR† Inserts Cat#	Qty.	Price*
KPDJW	25	$ 6.95	KPDJCC	25	$ 7.95
KPDJW	50	$11.95	KPDJCC	50	$13.95
KPDJW	75	$14.95	KPDJCC	75	$17.95
KPDJW	100	$17.95	KPDJCC	100	$21.95

Note: Call or write for FREE SAMPLE. Refills available too.
† Red, Yellow, Green, Orange, Pink

SATISFACTION GUARANTEED

NEW MACINTOSH* Aids

- **New Disk-File Kit #100:**
Includes **1** 3.5-D Disk File (holds 90 to 100 disks), **3** backstops, removable lid, **10** dividers, **samples** of color coded labels, StaticShield disk jacket & catalog of Weber's disk organizing aids **$9.95***
(Made of 200# corr. bd. Color: White)

- **New Disk-File Kit #200:**
Same as #100 (above) PLUS: **120** color coded disk labels, **1** Disk Holder stand, **25** white disk labels. All for only **$19.95***

- **New Disk-File Kit #300:**
Same as #200 (above) PLUS: **100** White disk labels, **1** Disk/Easel/Copyholder. . . . **$29.95***

- **New Disk-File Kit #400:**
Same as #300 (above) PLUS: **25** StaticShield Disk Jackets with **25** pockets to affix to the jackets, **25** color coded and **25** white insert cards, All for only **$49.95***

** Plus $3.00 for shipping & handling.*

weber and sons inc.
P.O.B. 1027 Adelphia, N.J. 07710
CALL **TOLL FREE 1-800-225-0044; NJ: 201-431-1128**

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MAIL TO: **WEBER & SONS, INC.,** P.O.B. 1027, Adelphia, N.J. 07710
CALL **TOLL FREE 1-800-225-0044; NJ: 201-431-1128**

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2.			
3.			
4.			
ADD FOR SHIPPING & HANDLING			$3.00
TOTAL ENCLOSED:			

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City/State/Zip:
☐ Mastercard ☐ Visa ☐ UPS/COD ☐ Check Enclosed
Credit Card #
Expiration Date:
Phone # (___) ___

CHECK ONE:
☐ **Include FREE Disk Easel/ Copyholder.**
☐ LID
☐ SLEEVE
☐ Latching Lid

TOLL FREE: 800-225-0044

COMPUTER's AND VCR's

TMK

New Low Price!
14-Day, 4-Event Electronic Tuning
VCR with Wireless Remote Control



$314.00

CABLE READY VHS VIDEO CASSETTE RECORDERS

This well built Japanese two head VCR is alot of bang for your buck and passed through stringent standards of quality control.

Features included are:

- 14 day/4 event or daily programming
- 105 channels
- 10 function wireless remote cotrol
- Slim line design front load
- Cue/review - electronic timer & tape counter
- Memory/rewind - auto rewind at end of tape
- Dew censor

Please add $10 for shipping & handling

NEW LOW PRICE!



$478.00

PANASONIC VHS VCR

From the people that orginated the standards for the VHS VCR industry, comes the model 1535. This 4 head machine with front loading comes with a reputation of quality.

The 4 head design allows crystal clear pause pictures and easy viewing in the slow scan mode.

Features included:

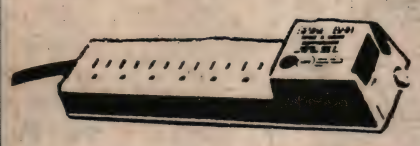
- Four head technology with Front Load
- 107 channel cable ready
- 17 function wireless remote control
- 2 week/4 program timer
- One Touch Recording
- OMNI SEARCH 2, 4, 6 hour tape formats
- Field still/Variable slow/ 2x play
- Picture sharpness control

Please add $10 for shipping & handling



Modem Spike Protector squashes spikes before damage can be done to your phone accessories. Response time (5 nanoseconds). 100% spike protection from line to line and line to ground. Exceeds telephone line standards for maximum high voltage protection. And easy to install.

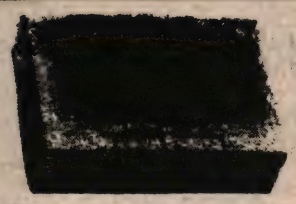
$2 for shipping $42.88



SK 6-6 Spike Bar
Protects against RFI/EMI, spikes and surges, 15 amps, (5 nanosecond response time) 6 outlets, 6 ft. cord master on/off swith.

$38.95

$2 for shipping



A Time Saver!
Parallel A-B
Switch Box
Switches all 36 lines
Connects 2 CPU's to 1 Printer
or 1 CPU to 2 Printer's

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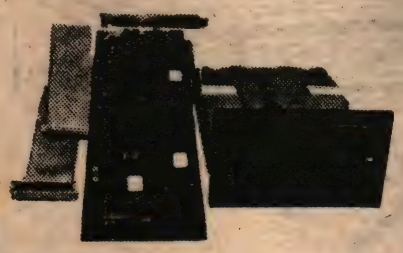
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IBM CLONE COMPUTER SUPPLIES

HARD DISK DRIVES



- 10 Meg. ½ Hgt. $275
- 20 Meg. ½ Hgt. $365
- Controller & Cable for above drives $149

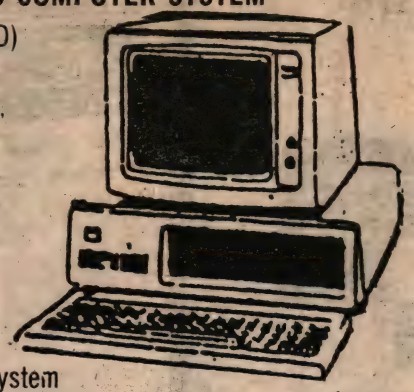
COMPLETE SYSTEMS

Drive ● Controller ● Cables

10 Meg $379
20 Meg. $459

20 MEG TURBO COMPUTER

A NO NONSENSE FULL BLOWN BUSINESS COMPUTER SYSTEM



- Dual ½ drives (DSDD)
- 20 Meg. & Controller
- Parallel, Serial, Game, clk/cal
- 640K memory
- Monochrome monitor (TTL)
- Monochrome card
- Compatible keyboard
- 135W Supply
- DOS 2.1 Operating System
- Bundled software

1 Yr. Warranty **$1649**

WE'VE GOT THE NEW QUMETRAK 142 LX DRIVES



- Double Sided Double Density
- ½ Height ● 48 TPI
- New Quiet Operation
- IBM Compatible
- New Front Panel Design

$69.95 Each **2/$129.95**

Dealer Inquiries Invited

DISKETTE DUPLICATOR

Stand-a-lone unit will copy information from one diskette - track by track - to another diskette. No computer needed! Copies all format diskettes as well as all copy protected diskettes. Takes only 45 seconds to copy. Extremely easy to use.



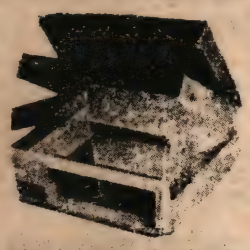
DISKETTE COPIER
$995.00



135 WATT IBM Power Supply
● 4 Drive Connectors
$85.00

AT COMPATIBLE PRODUCTS

- Motherboard w/640K $850
- Case $105
- Keyboard $79
- 192 Watt power Supply $149
- Western Digital hard & floppy cont. $275
- Multi I/O Card $99
- 1.5 MB Multi function ..... Call
- Quad density 1.2 Meg. drive $145



XT TYPE CASES

IBM LOOK-A-LIKE CASE

- Slide off cover
- Requires side switch power supply
- For exact IBM foot print boards only
- 8 slots in rear

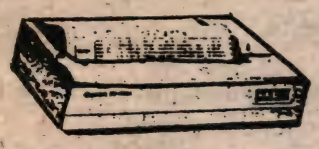
Case 60 ..... $59.95

HINGED TOP CASE

- Flip top cover
- Requires side switch power supply
- Fits all clone boards
- 8 slots in rear

Case 50 ..... $59.95

CANNON PRINTERS



CANNON PRINTERS

* Self test * 160 CPS Dot Matrix
* 27 CPS near letter quality mode
* Parallel interface
* Bi-Directional printing
* Friction or sprocket feed
* Full Epson character set w/graphics

Model 1080A (80 column) $199
Model 1156A (132 column) $275

XT OR AT KEYBOARD

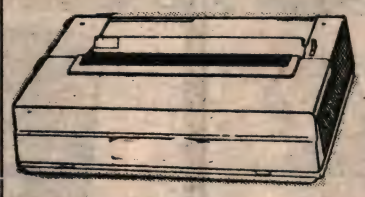


Manufactured by Micro-Switch

Can be used either on the XT or AT by setting a single jumper. 3 LED indicators on top right corner.

#5050 ..... $79.95

QUME PRINTER



QUME LETTER-PRO 20

* Letter quality Daisy Wheel
* Cassette Ribbon
* 22 CPS Print Speed
* Bi-directional carriage
* Parallel Interface

$425.00

IBM ADD ON BOARDS



STOCK#	DESCRIPTION	PRICE
FDC-501	Floppy disk controller w/cable - 4 drives	$45
FDC-507	Floppy Cont. w/serial, parallel & clock	$120
HDC-515	Hard disk controller w/cables (Omti)	$139
VID-401	Color Graphics Cards, IBM Specs.	$80
VID-405	Magic Video card w/TTL, RGB, & Composite outputs 640x400 color, 640x352 monochrome	$185
VID-406	Monochrome (TTL) card	$75
VID-408	Hi-Res mono/graphics w/printer port Hercules compatible	$99
SIO-250	Serial port card (second serial opt.)	$35
PIO-255	Parallel printer card	$29
MFC-110	Short I/O, parallel, serial, clk/cal	$99
MFC-100	Multi-funct. w/para., ser., clk/cal & 384K Exp. No mem. installed. Software	$109
MFC-120	576K memory expansion board (short card)	$65
EP-128	EPROM burner board, for IBM (2716-27128)	$129
RD-2	Bus Receiver & driver boards for Exp. chasis	$149
CLK-80	Clock/Calendar only board	$45

PUBLIC DOMAIN SOFTWARE

IBM COMPATIBLE $3.75/DISKETTE

PC-Write – Word processor
PC-File – Database Manager
PC-Calc – Spreadsheet
PC-Desk – Desk-top Manager
Games 1 – Arcade Games
Games 2 – Arcade Games
PC-Business – Business Accounting
PC-Talk 3 – Modem Program
PC-Home – Home Management

DELUXE DISKETTE FILE

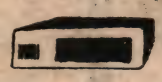


Holds 100 5¼" Diskettes

Easy access handle for opening and carrying. Comes with lock and key for security.

$14.95

EXPANSION CHASSIS RUN OUT OF SLOTS?



IBM PC/XT COMPATIBLES EXPANSION CHASSIS

PARTS

* 10 slot exp. bd $69.95
* 75 watt power sup. $79.95
* Exp. case $59.95
* Driver/Receiver boards w/cable $149.00

TAIWAN BASIC

Run Basic programs on your IBM clone. 4 chips $39.95

SPEED UP YOUR IBM OR COMPATIBLE BY 33% $19.95

New V-20 CPU Mfg. by NEC replaces the 8088 in your system. No compatibility problem. New on market so order early before high demand makes these scarce!!



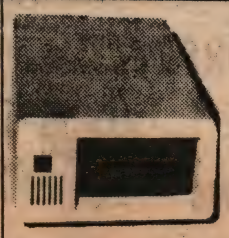
COMPUTER SURGE PROTECTOR

Features Surge Protectors. 6 outlet 3-prong plug. 6' cord & 15 amps!



$15.00

EXTERNAL DRIVE CASE & POWER SUPPLY



- 75 W. Power Supp.
- Drive Power connect.
- IBM Styling

$99.00

LOLIR LECTRONICS CORP.

13933 N. CENTRAL EXPRESSWAY
SUITE 212
DALLAS, TX 75243
214-234-8032 – 214-234-8056

MasterCard VISA

TERMS: Check or Money Order. COD's add $1.90. TX Res. add 6% tax. Please add $3.50 shipping. All out of stock items will be refunded.

SURPLUS COMPUTER COMPONENTS

TI COMPUTER SURPLUS

TI 640 OFFICE SYSTEM REPLACEMENT PARTS

CRT Controller boards $79
Floppy controller boards $85
AU Boards $50
SM1/M boards $50
8" Disc Drives $70
Power supply $85
Front door panel $45
Rear door panel $40

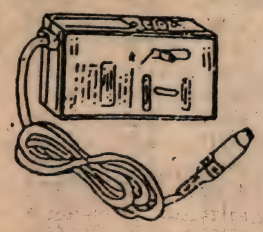
TI 990 COMPUTER SURPLUS

MAIN Chasis w/card slots, front panel, & power supply $125
Dual 8" Drives w/power supply ..$125

MORE TI COMPUTER SURPLUS

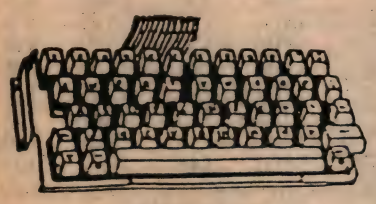
TI Silent 700 terminals $39
TI 913 Video term & kybd. $39
TI 9" TTL monitors w/case $27.50

TI 99-4A SURPLUS



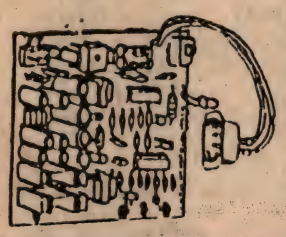
SOUND & VIDEO MODULATOR

TI #UM1381-1 — can be used with all video sources. Built-in A-B switch. Channel 3 or 4 output. Requires 12VDC power $3.50



KEYBOARD

PN 900181 — 48 keys. Measures 4"x9". Terminates to a 15 pin connector $3.75



SWITCHING POWER SUPPLY

INPUT: 14 VAC to 25.5 VAC.
OUTPUT: +12VDC @ 350MA.
+5VDC @ 1.2AMP.
−5VDC @ 200MA.
SIZE: 4.75 x 4.25 x 1.25"
PS-4A .....$3.50 ea or 10/$19.95



WALL PLUG ADAPTER

TN-21 — used with the above power supply. Output 21VAC @ 45VA.
TN-21 .....$3.50 ea or 10/$19.95

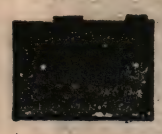
9" HIGH RESOLUTION (TTL) VIDEO MONITOR



NEW

Green Screen
12 VDC Required
Originally used in portable computers.
Stk. #964-02 .....$19.95

RADIO-SHACK COMPUTER SURPLUS



TRS-80 MOD III Motherboards

Populated boards with all IC's except ROM & RAM. We have a ton of these to close out!

TR-3B damaged boards with hole or corner clipped .....3/$14.00
Mod III ROM set $20.00
Mod III RAM set $15.00

TANDY 2000 Motherboards

Boards are solder line rejects. Missing ROMS. RAMS & all PROMS. Limited quantities.
Motherboard $34.95

XEROX 820-I



XEROX 820-I
Z80 SINGLE BOARD COMPUTER

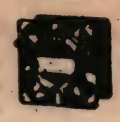
- 64K RAM
- 80x24 Video
- Floppy disk controller
- 2 parallel ports
- 1 serial port

Assembled & Tested
$89.95



SHUGART 8" DISC DRIVES FOR XEROX 820 $65.00

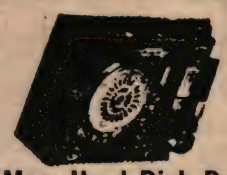
SSDD
MFG Mod 701 DSDD $79.00
Shugart Mod 850 .....$69.95



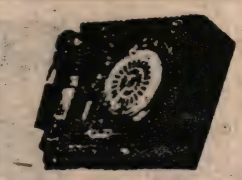
SPRITE FANS 3"

$4.00

ULTRAVIOLET TUBES GOOD FOR EPROM ERASERS
$3.95 EACH
10/$22.50



40 Meg. Hard Disk Drive
January — Special
Quantum Q-540
$450.00



TEC 501 Disk Drive
SSDD ½ Hgt.
Good for Xerox, Atari, Commodore, etc.
$39.95



CONTROL DATA
Quad Density
96 TPI Drives
$49.95

APPLE SURPLUS PRINTERS



Silent Type III
$59.95

Popular DB Series Computer Connectors



DB-9 Male solder pot $1
DB-9 Female solder pot $1
DB-9 hoods .....$.65
DB-25 male solder pot $1.25
DB-25 female solder pot $1.25
DB-25 hoods .....$.75



COMPUTER SPEAKERS

2.25" 8 ohm. .25 watts. This is the same speaker that IBM uses. Excellent for computer builders.
Stk. #SPK-8 .....$1.25

XEROX SURPLUS
XEROX 1810 MOTHERBOARD

The 1810 is a portable CPM Machine that never made it into mass production. These Z-80 motherboards are becoming collectors items. These boards have on board serial, parallel, video w/RF modulator, & 64K memory. Boards are solder line rejects and are missing some chips. ROM set inlcuded.

LIMITED QUANTITY SO ORDER EARLY!!!
Xerox-1810 .....$39.95
CPM Boot Disk $6.00



$149.00

Diablo S-11 Printer
100 CPS
Near letter qual. mode

KAYPRO SURPLUS



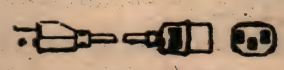
KAYPRO EQUIPMENT

9" Green Monitor (K2) $45.00
81 Series ROMS (K2) $7.00
Keyboard (K2 New) $75.00
Keyboard - Siemens w/case ...$65.00

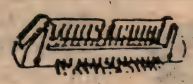
KAYPRO MAINBOARDS

K2 Socketed (no ICs) $37.50
K2 populated, tested $129.00
K10 tested $225.00
Pro-8 Upgrade kit $39.00

COMPUTER POWER CORDS



$1.25 EA — 10/$10



RIGHT ANGLE HEADERS

40 Pin .....$.40
34 Pin .....$.50
10 Pin .....$.25



WIRE

TEST PROBE WIRE

18 Guage rubber coated. Red, black, white or blue .....100'/$3

HOOK-UP WIRE

24 Guage stranded cond. 22 Guage solid conductor, your choice .....100'/$2

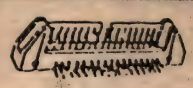
WIRE WRAP WIRE

30 Guage solid cond. Choice of colors. Wir-30 .....100'/$2.50



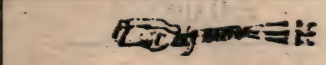
22/44 CONNECTOR

Spacing .156". Solder eyelet style. Gold connections....$1



RIGHT ANGLE HEADERS

40 Pin .....$.40
34 Pin .....$.50
10 Pin .....$.25



CASSETTE INTERFACE CABLE

CIC-93 — has DB-9 connector on one side to 3 RCA phono jacks on the other end. .....$1.50 ea or 10/$10.00



TI GAME CABLE

CAB-15 — one end has a DB25 female going to 2 DB15 female connectors. Cable is 6' long.....$4.00



POWER SUPPLY
MFG. BY GENERAL INSTR.

INPUT: 110VAC
OUTPUT: +5VDC @ 5 AMPS
+12VDC @ 2.5AMPS
−12VDC @ .3AMPS
PS-120 .....$24.50

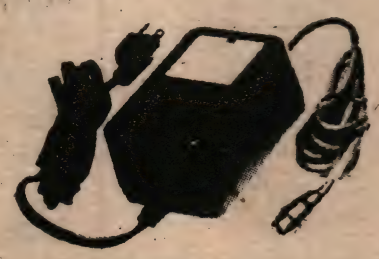


COMMODORE SURPLUS
12" GREEN SCREEN MONITOR

Composite Video Input built in power supply. Requires 18VAC XFMR.
Useable on IBM's $19.95

COMMODORE C-64 & V-20

Replacement
Power Supply
$14.50



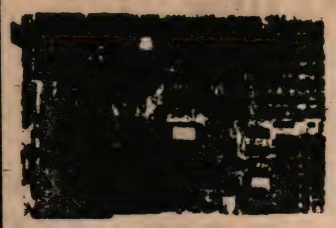
LOLIR LECTRONICS CORP.
13933 N. CENTRAL EXPRESSWAY
SUITE 212
DALLAS, TX 75243
214-234-8032 — 214-234-8056

master charge

TERMS: Check or Money Order. COD's add $1.90. TX Res. add 6% tax. Please add $3.50 shipping. All out of stock items will be refunded.

VISA

MORE GOOD ELECTRONICS COMPONENTS

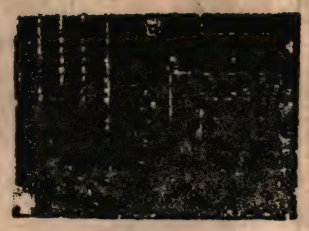


Compare To ACS-1000 Board! Best Value

HIGH SPEED SEVILLE - XT

- New 8MHZ Operation
- New BIOS - Eliminates many of the problems in the DTC Mega-Bios
- No time delays req'd - all time delays replaced by low cost TTL IC's
- No special mapping PROMS or PALS required
- On board floppy disc controller - 4drives
- On board serial & parallel ports
- Board will mount in IBM footprint
- Max. 512K memory on board

Seville Easy board - all passive components, sockets & connectors soldered in place $189
Kit of all IC's w/128K $155
Seville Assembled & Tested w/128K $425
ROM BIOS $24.95
Manual with Schematics $10



TEXAS TURBO BOARD

256K Stand. (640K Max)
4.77 & 7.77 MHZ
IBM Footprint
8 I/O Slots
Tested w/256K — $295

ATARI REPLACEMENT POWER SUPPLIES



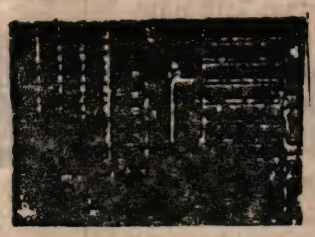
11.5 VDC @ 1.95 AMP
$7.95

BARGAIN IC PRICES "LSXXX"

LS00	$.15	LS162	$.60
LS01	$.15	LS163	$.35
LS02	$.15	LS164	$.50
LS03	$.15	LS165	$.80
LS04	$.15	LS166	$.75
LS05	$.15	LS169	$1.00
LS08	$.15	LS174	$.35
LS09	$.15	LS175	$.35
LS10	$.15	LS181	$1.25
LS11	$.15	LS191	$.80
LS12	$.25	LS192	$.70
LS13	$.30	LS193	$.74
LS14	$.25	LS194	$.60
LS15	$.30	LS195	$.50
LS20	$.15	LS196	$.70
LS21	$.18	LS197	$.75
LS27	$.21	LS221	$.50
LS30	$.15	LS240	$.60
LS32	$.20	LS241	$.60
LS33	$.25	LS242	$.90
LS37	$.30	LS243	$.80
LS38	$.25	LS244	$.50
LS42	$.30	LS245	$.50
LS51	$.20	LS251	$.45
LS54	$.25	LS253	$.40
LS55	$.20	LS257	$.45
LS73	$.30	LS258	$.50
LS74	$.23	LS259	$1.00
LS85	$.45	LS260	$.40
LS86	$.19	LS266	$.30
LS93	$.50	LS273	$.75
LS107	$.28	LS279	$.30
LS109	$.20	LS280	$.80
LS112	$.30	LS283	$.35
LS122	$.35	LS290	$.65
LS123	$.42	LS293	$.75
LS124	$1.40	LS298	$.65
LS125	$.30	LS299	$1.50
LS126	$.40	LS322	$2.50
LS132	$.40	LS323	$2.25
LS133	$.25	LS364	$.90
LS138	$.35	LS366	$.40
LS139	$.30	LS367	$.40
LS145	$.55	LS368	$.30
LS151	$.40	LS373	$.50
LS153	$.30	LS374	$.75
LS154	$.75	LS375	$.35
LS155	$.40	LS377	$.90
LS156	$.40	LS378	$.80
LS157	$.30	LS390	$.80
LS158	$.40	LS393	$.75
LS160	$.50	LS399	$1.00
LS161	$.40	LS670	$1.24

ASSEMBLE YOUR OWN CLONE BD.

IBM Compatible ● 256K Board
Easy Bd. with all components (except IC's) soldered in place. Tested $99.00
Kit of all IC's $69.95
Complete with Manual
"BEST BUY"



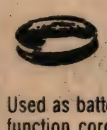
POWER SUPPLY

NO VAC INPUT
OUTPUT:
+5 @ 1amp
+12 @ 1amp
+24 @ 1amp
$4.95

TI CALCULATOR XFMR



WALL PLUG ADAPTERS
6VDC @ 300ma
$1.75 or 10/$12.50
12VAC @ 265ma
$2.50 ea or 10/$15.00



3 VOLT LITHIUM BATTERY

Used as battery back-up on most multi-function cords.
Mallory BR-2325
$1.00 EACH — 10/$5.00
Holder for above $.75



BARRIER STRIP ASSORTMENT
100 PC's/$5.00
Bar-100



TV-GAME SWITCH
$.65 EACH
OR 10/$4.25



RIBBON CABLE
9 Conductor
Grey w/red stripe
.1 spacing
250' Roll $5.00

CRYSTALS

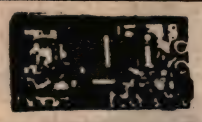


FREQUENCY	CASE PRICE
4.0MHZ HC-18	$1.25
6.0MHZ HC-18	$1.25
8.0MHZ HC-18	$1.25
10.7MHZ HC-18	$0.75
14.318MHZ HC-18	$1.25
18.432MHZ HC-18	$1.25



TRANSFORMER SPECIALS

STK#	PRIMARY (VAC)	SECONDARY (VAC)	DIMENSIONS (L*W*H INCHES)	PRICE
TN-6.3	117	6.3 @ 300ma.	1.5x1x1.25	$1.25
TN-12	117	12 @ 400ma.	1.5x1.5x1.25	$1.35
TN-24A	117	24 @ 200ma.	2.75x2.3x2.4	$1.25
TN-24B	117	24ct @ 3.6amp	3.1x2.75x2.5	$3.50



8" DRIVE POWER SUPPLIES — $24.50



9 VOLT BATTERY CONNECTORS
10/$1.00

COLECO JOYSTICKS
$2.95 OR 10/$25.00
NEW!



4 CONDUCTOR 6' COILED CORD
2/$1.00



TOY MOTORS
12 VDC
2/$1.00

CIRCUIT BOARDS

Sound generator boards removed from electronic pin-ball games. Contains oscillators, control circuits, & 2 watt audio amp. Experimenters dream!!!
$2 ea 10/$12.50 w/schematics

5V & 12V REGULATOR BOARD

Regulator board containing 5v & 12v TO-220 regulators, fuses, bridges, caps, & I/O connectors. Side 2" x 4". W/heatsinks.
REG-512 ..... $3.50

24V REGULATOR BOARD

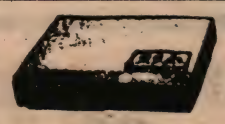
Regulator board for 24v @ 2amp power supply. 2" x 3.5" size.
REG-24 ..... $3.50

RECTIFIER BOARD

Contains (4) 10amp bridges, (3) large filter caps, & I/O conn. Size 4.5" x 8".
BRDG-4 $2.50 ea or 10/$12.50

LINEAR & CMOS BONANZA

Circuit board removed from SINGER electronic calculators. Has 20 linear & CMOS IC's & a wealth of other parts.
BD-20 .$2.50 ea or 10/$12.50



TOCOM 55 PLUS CABLE TV CONNECTOR

We Received A Large Shipment Of These Cable Converters. Good Savings!

Complete Unit — $24.50
Mainboard — $12.50
Power Sup. — $7.50

7.5 mhz Speed Xturbo

- 8088 2 high speed on board CPU
- 8 slots
- 640K Max Mem.
- IBM Footprint
- Operating speed keyboard controlled

IBM Compatible Mother Board

$365 w/64K

VOLTAGE REGULATORS



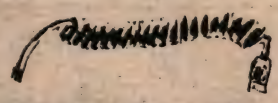
7805 5v 1.5 amp
7812 12v 1.5 amp
7824 24v 1.5 amp
7905 —5v 1.5 amp
7905 —5v 1.5 amp
7912 —12v 1.5 amp
$.43 EACH

DIABLO SERIES 30 POWER SUPPLIES

Used in Diablo Printers
$50.00

DB25 CONNECTOR ASSORT.

Removed from equip. (useable)
Male & Female ..... 10/$2.00



KEYBOARD CABLE - 6' COILED
Phone Jack to Spin Din.
$4.50

IBM CLONE HRDWRE

Card Guides ..... 5/$3.00
Card Brackets:
Plain $1.00
RS232 ..... $2.00
Video $2.00
Rubber Feet ..... 4/$2.00

MICROPROCESSOR EPROMS

8741A	$4.50
8755A-9	$6.50

EPROMS

2716-350	$2.00
2516-450	$2.65
2532-350	$3.88
2732-250	$2.45
2764-250	$3.50
MCM68764	$15.75
27128-300	$5.00

8000 SERIES

8087-2	$140
8087-3	$115
8088	$5.50
8237-5	$4.85
8250	$5.75
8253-5	$2.25
8255A	$2.25
8259-5	$2.25
8272	$3.25
8284A	$2.50
8288	$4.50



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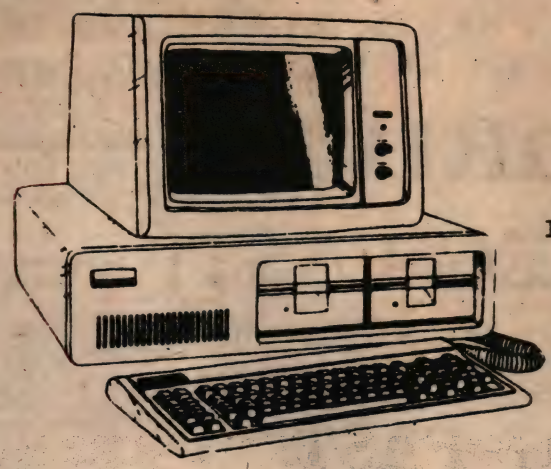
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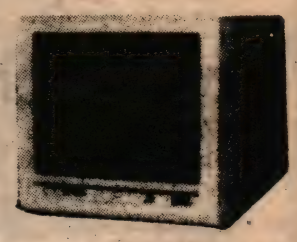
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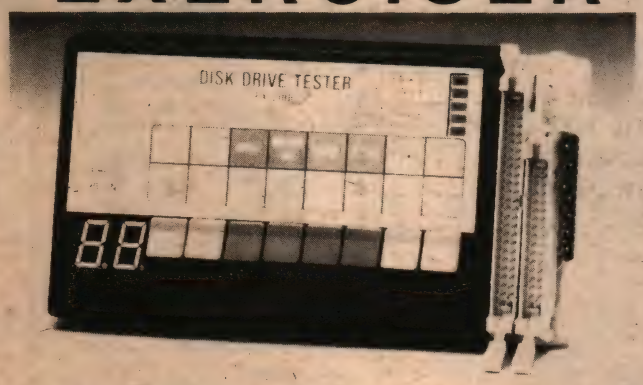
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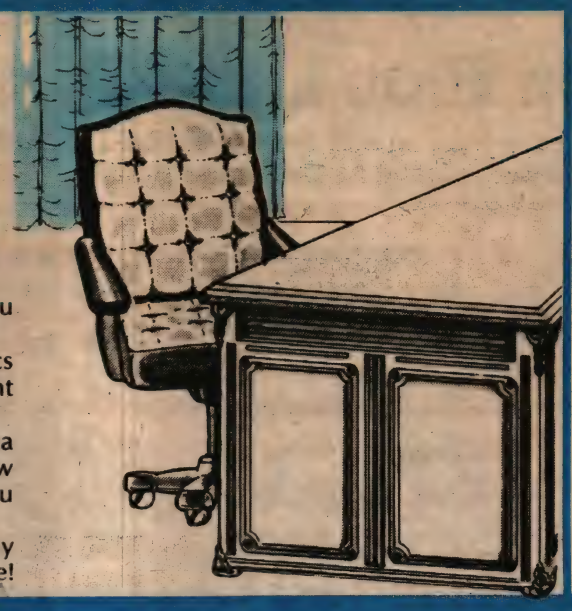
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In fact, we've found that a good diskette manufacturer simply manufactures a good diskette...no matter what they charge for it. (By way of example, consider that none of the brands that we carry has a return rate of greater than 1/1,000th of 1 percent!)

In other words, when people buy a more expensive diskette, they aren't necessarily buying higher quality.

The extra money might be going toward flashier advertising, snazzier packaging or simply higher profits.

But the extra money in a higher price isn't buying better quality.

All of the good manufacturers put out a good diskette. Period.

How to cut diskette prices ...without cutting quality.

Now this discovery posed a dilemma: how to cut the price of diskettes without lowering the quality.

There are about 85 companies claiming to be "diskette" manufacturers.

Trouble is, most of them aren't manufacturers.

Rather they are fabricators or marketers, taking other company's components, possibly doing one or more steps of the processing themselves and pasting their labels on the finished product.

The new Eastman Kodak diskettes, for example, are one of these. So are IBM 5¼" diskettes. Same for DYSAN, Polaroid and many, many other familiar diskette brand names. Each of these diskettes is manufactured in whole or in part by another company!

So, we decided to act just like the big guys. That's how we would cut diskette prices...without lowering the quality.

We would go out and find smaller companies to manufacture a diskette to our specifications...specifications which are higher than most...and simply create our own "name brand" diskette.

Name brand diskettes that offered high quality at low prices.



Super Star diskettes are sold in multiples of 50 only. Diskettes are shipped with white Tyvec sleeves, reinforced hubs, user ID labels and write-protect tabs.

Boy, did we get lucky. Our Super Star Diskettes are the same ones you've been using for years...without knowing it.

In our search for the low priced, high quality diskette of our dreams, we found something even more interesting.

We found that there are several manufacturers who don't give a hoot about the consumer market for their diskettes. They don't spend millions of dollars in advertising trying to get you, the computer user, to use their diskettes.

Instead, they concentrate their efforts on turning out the highest quality diskettes they can...because they sell them to the software publishers, computer manufacturers and other folks who (in turn) put their name on them...and sell them for much higher prices to you!

After all, when a software publisher or computer manufacturer or diskette marketer puts their name on a diskette, they want it to work time after time, everytime. (Especially software publishers who have the nasty habit of copy-protecting their originals!)

Super Star Diskettes. You already know how good they are. Now you can buy them...cheap.

Well, that's the story.

Super Star diskettes don't roll off the boat from Pago-Pago or emerge from a basement plant just east of Nowhere.

Super Star diskettes have been around for years...and you've used them for years as copy-protected software originals, unprotected originals. Sometimes, depending on which computer you own, the system master may have been on a Super Star diskette. And maybe more than once, you've bought a box or two or more of Super Star diskettes without knowing it. They just had some "big" company's name on them.

Super Star Diskettes are good. So good that a lot of major software publishers, computer manufacturers and other diskette marketers buy them in the tens or hundreds of thousands.

We buy them in the millions.

And than we sell them to you.

Cheap.

When every little bit counts, it's Super Star Diskettes.

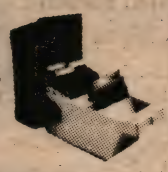
You've used them a hundred times...under different names.

Now, you can buy the real McCoy, the same diskette that major software publishers, computer manufacturers and diskette marketers buy...and call their own.

We simply charge less.

Super Special!

Order 50 Super Star Diskettes and we'll be happy to sell you an Amaray Media-Mate 50 for only $8.75, shipping included...a lot less than the suggested retail price of $15.95.



Regular DISK WORLD! price: $9.69 ea. + $2.00 Shpng.

DISKETTE STORAGE CASES

DISK CADDIES

The original flip-up holder for 10 5¼" diskettes. Beige or Grey only.

$1.65 ea. + .20 Shpng.



DISKETTE 70 STORAGE

Dust-free storage for 70 5¼" diskettes. Six dividers included. An excellent value.

$9.95 ea. +$3.00 Shpng.



HOURS:
Human: 8AM-6PM Central Time, Monday through Friday
Answering Machine: 6PM-8AM, All Times
MCI MAIL: 24 hours a day.

HOW TO ORDER:

ORDERS ONLY:
1-800-621-6827
(In Illinois: 1-312-256-7140)

INQUIRIES:
1-312-256-7140

FOR FASTEST SERVICE, USE NO-COST MCI MAIL: Our address is DISKORDER. It's a FREE MCI MAIL letter. No charge to you. (Situation permitting, we'll ship these orders in 24 hours or less.)

SHIPPING: 5¼" & 3½" DISKETTES—Add $3.00 per each 100 or fewer diskettes. **OTHER ITEMS:** Add shipping charges as shown in addition to other shipping charges. **PAYMENT:** VISA, MASTERCARD and Prepaid orders accepted. **COD ORDERS:** Add additional $5.00 special handling charge. **APO, FPO, AK, HI & PR ORDERS:** Include shipping charges as shown and additional 5% of total order amount to cover PAL and insurance. We ship only to United States addresses, except for those listed above. **TAXES:** Illinois residents, add 7% sales tax.

MINIMUM ORDER: $35.00.

The Super Star LIFETIME WARRANTY!

Super Star Diskettes are unconditionally warranted against defects in original material and workmanship so long as owned by the original purchaser. Returns are simple: just send the defective diskettes with proof of purchase, postage-paid by you with a short explanation of the problem, and we'll send you the replacements. (Incidentally, coffee stained diskettes and diskettes with staples driven through them don't qualify as "defective".)

WE WILL MEET OR BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES SUBJECT TO THE SAME TERMS AND CONDITIONS.

DISK WORLD!, INC.

629 Green Bay Road
Wilmette, Illinois 60091

BUSINESS TELEPHONE SYSTEMS

MidWest Micro now offers you a sophisticated small Business Telephone System that's simple with. . .

MidWest 510 KT

ONLY $1799 With Money-Back Guarantee

Full-Featured Key Telephone System

ATTENTION DEALERS!

Dealers –

This system is an ideal item to set up in your store to use and demonstrate. It requires practically no support and fits the needs of 80% of the 11 million small to medium size businesses in the U.S. **CALL TODAY FOR DEALER DISCOUNTS UP TO 30% OFF!** Your margins can be 50 points or more.

Key System Price Includes:

★ Complete, ready to install, full-featured, key service unit.

★ 4 full-featured key telephones. (Additional phones available.)

MW 510 KT

When we found out that we could offer you a complete state-of-the art electronic telephone system for only $1799 we were ecstatic! But we did have a few serious questions. Who is going to install this for our customers? Is it going to be reliable? Who will repair it?

Well, the answers were quite exciting. The system is so well engineered that the average handyman can install, test and repair it simply and easily in a couple of hours. The **510 KT** system includes self-diagnostics in the uncommon event that the system needs repair. And repairs are a simple matter of board swapping.

Features are easily programmed by a single key telephone set. You don't have to be a computer wizard. The user gets sensible, easy to use features and has the flexibility to change the data-base station, and to change restrictions without rewiring or calling for service.

When you consider the people behind the system, you'll be even more interested in the **510 KT**. The researchers and engineers combine over fifty years experience in the telecommunications industry from the most respected labs in North America: Bell Lab, Bell Canada, Northern Telecom and CDC. The manufacturer build PABX and PCM systems, and other high-tech products. Perhaps best known among them is the monitor for the IBM PC (for which they earned IBM's Zero Defect Award). The **510 KT** is backed by a one year warranty on all equipment manufacturer defects. Emergency replacements are provided, but there's not much chance you'll ever need one.

MW 510 KT was designed for small businesses. There's not another telephone system on the market that can do as much, as simply for less money. There are more complex systems, but chances are they have more gadgets than a small business would ever use, and they're a lot more expensive. There are less expensive and more limited systems that will cost more in the long run with repairs, installation charges and expansion. The **510 KT** is quickly installed, and it has the flexibility to make changes that would require service calls with other systems. The modular system is easy to expand, so it can grow with small businesses. Look into the **510 KT**, it answers the call of small business.

FEATURES

SYSTEM
- system diagnostic indicator
- data base change by a single key set
- flexible extension number assignment
- power failure backup
- power failure transfer
- volume control

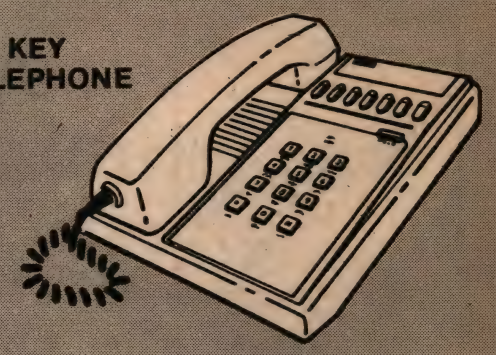
CENTRAL OFFICE CALLING
- multiline pick up
- private line
- last number redial
- abbreviated dialing
- toll restriction
- night service
- switch-hook flash
- music on hold
- on hook dialing

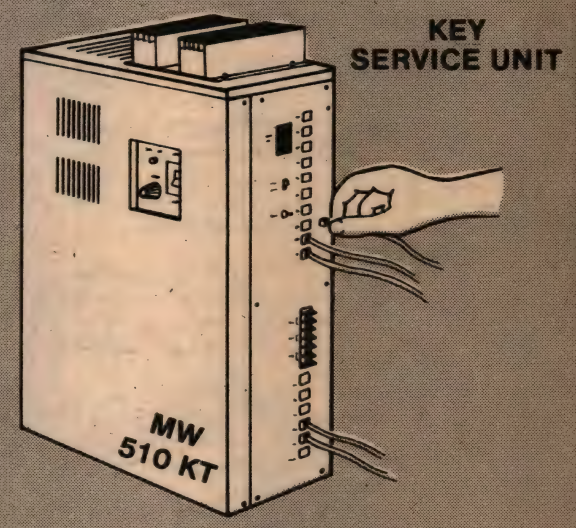
INTERCOM CALLING
- call forward
- call pickup
- call waiting
- audible signal indicating called party busy
- station paging
- talkback to paging station
- two intercom links

CENTRAL OFFICE AND INTERCOM CALLING
- line status indication
- distinctive ringing
- hold
- exclusive hold
- t-hold
- hold recall
- privacy
- monitoring
- do not disturb
- three-way conferencing

OPTIONAL FEATURES
- zone paging via external speakers
- speaker phone
- hand free talk back
- (SMDR) time/date/# called/duration recording (optional)
- call message display
- time of day display
- stop watch for call time
- directory of abbreviated dialing number display
- feature operation display
- dialed number display
- canned message content display
- adjunctor converting POT set into 510 KT compatible set

SPECIFICATIONS
Central Office line capacity: 5
Intercom link: 2
Key sets capacity: 10
Input power: AC 110V 50/60 Hz
Power consumption: 40 watt
Cable: 6-wire, Star Connection
Dimension & Wt.: 17" x 12.5" x 5.5" 22 lbs.
Operating temp: 32-104 degrees F





MidWest 206 KT

ONLY $899

Includes:
- Key Service Unit
- 3 Full-Featured Key Telephones

MW 206 KT

The **MW 206 KT** system is a two-line, six extension telephone system which uses the same keyset as MW 510 KT; therefore, the features outlined in the attached literature are identical in both systems. The only difference between the two systems is their capacity (and KSU). this is a very attractive benefit to small, growing companies who do not need a larger system now but expect to expand in the near future. When the time comes to expand to the 510, all that is required is a KSU change. Much less expensive than purchasing a completely new system!

MONEY BACK GUARANTEE

We're so sure you'll be delighted with our phone systems that we offer this guarantee. If, within 15 days, you are not completely satisfied with your telephone system from MidWest Micro, you simply return it in like-new condition with all packaging and materials and receive a full refund of your purchase price.

SYSTEM
- System diagnostic indicator
- Data base change by a single key set
- Flexible extension number assignment
- Power Failure memory backup
- Power failure transfer
- Volume control

INTERCOM CALLING
- Call forward
- Call pickup
- Call waiting
- Audible signal indicating called party busy
- ICM tone plant
- Station paging
- ICM HF talk back

CENTRAL OFFICE CALLING
- Multi-line pick up
- Private line
- -10 per station
- -30 per system
- Toll restriction
- Night service
- Switch-hook flash
- Music on hold
- On-hook dialing
- External music on hold
- Direct call

SPECIFICATIONS
Central office line capacity: 2
Intercom link: 1
Key sets capacity: 6
Input power: AC115V 50/60 Hz
Power consumption: 25 watt
Cable: 6-wire, Star Connection
Dimensions & Weight: 387 x 292 x 132 (mm ^{3}), 5.6 kgs.
Operating temp: 32-104 degrees F

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COMPLETE 192k apple® COMPATIBLE SYSTEM

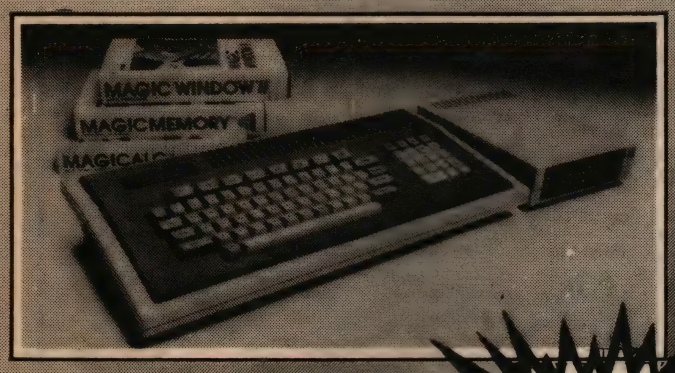
MidPro 3000 COMPUTER SYSTEM

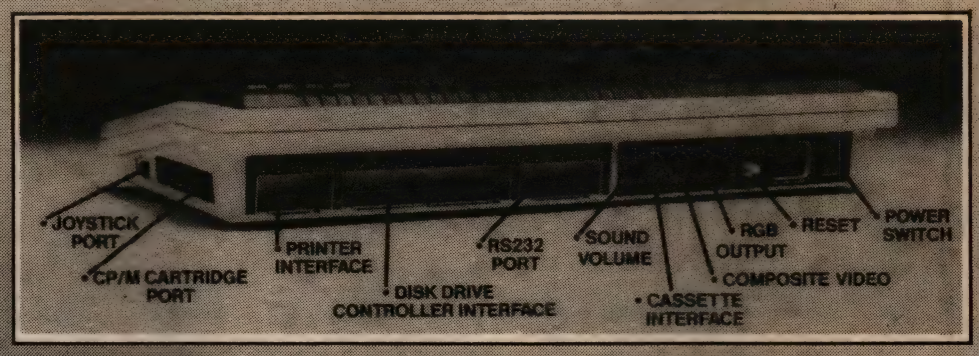
$499 COMPLETE

DOUBLE SAFE GUARANTEE

Part I – 14-Day Money-Back Guarantee!
You must be satisfied or you get a full refund of your purchase price.

Part II – 180-Day Replacement Warranty if equipment fails due to faulty workmanship or material.





A Total Package Including. . .

- 192K System Unit
- 144K MidPro Disk Drive
- Magic Window® II (Word Processor)
- Magic Memory™ (Electronic Filing)
- Magicalc™ (Electronic Spread Sheet)

Runs Thousands of Apple Programs

More features than Apple® for less than a Commodore®. . . only $499!

MidPro 3000™...a total package including 192K main unit, MidPro Disk Drive and Magic Window® II (word processor) Magic Memory™ (data base) and Magicalc™ (spread sheet)...all for $499!

MidPro 3000 comes with built-in features Apple® can't match at 3 times the price. Build up a Commodore® to match, and we still cost less! Check Apple®. Check Commodore®. Then check out MidPro 3000 and compare!

- Apple® and optional CP/M compatibility
- Built-in Microsoft® BASIC
- Built-in RGB and composite video output
- Built-in 80 column display
- Built-in Centronics printer interface
- Built-in numeric keypad
- Built-in function keys
- Built-in 4 channel, 6 octave sound
- 192 RAM
- Bundled with ARTSCI's™ Magic Window II, Magic Memory and Magicalc
- 6-month Warranty

ACCESSORIES	LIST	SALE
*2nd Disk Drive	$299.95	$149.95
*2 professional analog joysticks	39.95	24.95
*Z-80 cart. allows CP/M use	$CALL$	$CALL$
*RS232 adapter	99.95	59.95
*R/F Modulator (TV hookup)	29.95	19.95
*RGB cable (RGB Monitor hookup)	24.95	19.95
*Centronics cable (for Centronics printer)	39.95	24.95
*Technical reference manual	29.95	19.95
*80 column Hi-Res Amber Monitor	199.00	89.95

APPLE® and COMMODORE® are registered trademarks of Apple® Computer Inc., and Commodore® Business Machines, Inc., respectively.

MidPro 3000 SPECIFICATIONS

MidPro 3000™ is a complete, self-contained computer based on the popular 6502A microprocessor and can tap into the tremendous software library of Apple®II. Standard features include192K Bytes RAM, 32KB Enhanced Microsoft® BASIC, 80 column text, 560H X 192V color graphic display, 81-key sculptured keyboard and high efficiency switching power suply. Also included as standard are Centronics® bus printer interface. Cassette interface and 4-channel sound generator.

Processors
- 6502A Central Processor running at 2 MHZ or 1 MHz.
- 8048 as I/O processor.
- Two custom design LSI's for video processing, memory management and system control.

Memory
- 192k Bytes User RAM standard.
- 32k Bytes Enhanced Microsoft® BASIC in ROM.

Video Display

• TEXT
- 40 columns x 24 rows or 80 columns x 24 rows software selectab.e
- 5 x 7 characters in 7 x 8 matrix.
- Upper and lower case characters.
- One of Eight colors for characters/graphics and background – Red, Green, Blue, Cyan, Magenta, Yellow, Black and White.
- Character set with normal, inverse and flashing capabilities.

• **GRAPHICS**
- 280H x 192V 6 colors – Blac, White, Violet, Green, Blue, Orange.
- 280H x 192V 8 colors bit image – Black White, Red, Green, Blue, Cyan, Magenta, Yellow.
- 560H x 192V 6 colors – Black, White, Violet, Green, Blue, Orange, (High resolution color monitor required)
- All graphic modes software selectable.

I/O

• **Keyboard**
- 81-key sculptured typewriter keyboard
- Numeric keypad.
- 8 user-defined function keys.
- Cap-lock indicator.

• **Video Output**
- Color composite video output.
- RGB output to color monitor.

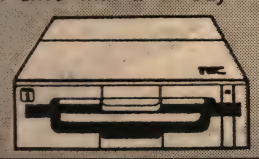
• **Sound Output**
- 4-channel programmable sound generator with 6 octaves.
- Audio speaker built in.

• **Interface**
- Centronics® bus printer interface built in.
- Cassette interface built-in
- RS232C interface optional.
- Analog Controller optional.
- Floppy disk controller module.
- CP/M® cartridge optional.

• **Power Supply**
- 110V 50Hz/60Hz.

apple® Compatible Disk Drive Special

Get a quieter, faster, more reliable disk drive with a 14-Day Satisfaction Guarantee and SAVE 50%.



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Save Even More!!! Complete your MidPro 3000 Computer System with a printer from our large inventory of popular models...

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IBM XT COMPATIBLE SYSTEM FEATURES: 256K RAM, SUPER XT MOTHER BOARD, TEAC 55-BV DRIVE, CONTROLLER CARD, COLOR CARD, 135 WATT POWER SUPPLY, FLIP TOP CASE, IBM STYLE KEYBOARD. FULLY ASSEMBLED AND TESTED. SPECIAL PROMOTIONAL PRICE. ONLY **$699.00**

SUPER XT MOTHER BOARD AS IN VIPC-XT SYSTEM, 8 I/O SLOTS, 0-256K RAM, 8088 CPU, OPTIONAL 8087, COMPLETELY ASSEMBLED & TESTED. ZERO K **$179.00** 64K RAM INCREMENTS (NINE 4164-150 NS) **$9.99**

AMERICAN XT MOTHER BOARD, SAME FEATURES AS SUPER XT MOTHER BOARD, FOUR LAYER P.C. BOARD, ACCEPTS 4164 & 41256 RAM CHIPS, UP TO 1 MEGABYTE RAM ON BOARD! COMPLETELY ASSEMBLED & TESTED. **$289.00**

IBM PC/XT HARD DISK AND ACCESSORIES

TEAC 55-BV 360K D/S D/D 1/2 HEIGHT $85.00
TEAC 55-FV 720K D/S QUAD DENSITY 1/2 HEIGHT $109.00
TEAC 55-FGV IBM 'AT' 1.2 MEGABYTE DRIVE $129.00
OMEK OM5AT 360K IBM 'AT' DRIVE, BEIGE FRONT PLATE $139.00
SHUGART SA-455 360K D/S D/D 1/2 HEIGHT $85.00
IBM 'AT' HARD & FLOPPY MOUNTING RAILS (PAIR W/HARDWARE) $6.00
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WESTERN DIGITAL X2 (NEW MODEL) WITH CABLES $129.00
DTC 5150 BX CONTROLLER CARD WITH CABLES & KIM 11 BIOS $149.00
KIM 12 BIOS EPROM CHIP AVAILABLE ON REQUEST. PLEASE CALL.
COMPUTER PERIPHERAL 7-PAC MULTIFUNCTION BOARD. FEATURES 0-384K RAM, SERIAL, PARALLEL, CLOCK, CALENDAR, RAM DISK, PRINTER SPOOLER, BACK-UP BATTERY W/OVERCHARGE PROTECTION. SOFTWARE UTILITIES DISK INCLUDED. TWO YEAR WARRANTY. ZERO-K $149.00
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4164-150 NANO SECONDS OR FASTER, SET OF (9), TESTED & GUARANTEED ..... **$9.99** PER SET
AS LOW AS 75¢ EACH IN LARGER QUANTITY ..... $CALL
IBM MATH COPROCESSOR CHIP, INTEL 8087-3, NEW "1985" MANUFACTURER DATE CODE: 100% TESTED & GUARANTEED $115.00
130 WATT HEAVY DUTY POWER SUPPLY WITH FAN, REPLACES ORIGINAL IBM 65 WATT UNIT, SAME MOUNTING SPECS & DIMENSIONS, ONLY $119.00
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A.C. POWER STRIP



SIX OUTLETS WITH SURGE PROTECTION, CONSIST OF (M.O.V.) METAL OXIDE VARISTOR AND SPIKE DETECTORS, U.L. LISTED COMPONENTS, SIX FOOT GROUNDED CORD, OPTIONAL WALL OR FREE STANDING MOUNT, LIGHTED POWER SWITCH INDICATOR. USE FOR ANY ELECTRICAL APPLICATION.

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(B) 10 AMP REPLACEABLE FUSE, 1250 WATT POWER HANDLING $11.99

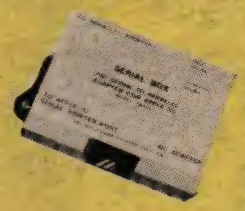
APPLE ACCESSORIES

APPLE DISK II TYPE DRIVE MITAC AD-1 SHUGART SA-390 MECHANISM (SAME AS APPLE) 100% COMPATIBLE FOR ALL APPLE II, II+, & IIE COMPLETE WITH MATCHING CASE & CABLE, READY TO PLUG IN, SPECIAL ONLY $125.00
NEW MITAC AD-3C DISK DRIVE FOR APPLE IIC EXTERNAL DRIVE JUST FOR APPLE IIC, *NO CARDS NEEDED!* ATTRACTIVE DESIGN, COLOR COORDINATED WITH IIC, CASE. PRECISION DIRECT DRIVE, DIRECT-CONNECT 19 PIN CABLE JUST PLUGS IN: 100% HARDWARE & SOFTWARE COMPATIBLE WITH APPLE IIC: FULL 1 YEAR WARRANTY, SPECIAL ONLY $139.00
DISK CONTROLLER CARD FOR 1 OR 2 DRIVES II+, IIE $35.00
16K RAM LANGUAGE CARD UPGRADE, 48K II & II+ TO 64K RAM $35.00
PRINTER CARD WITH CENTRONICS PARALLEL CABLE II+, IIE $35.00
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#1 BEST SELLER, THOUSANDS SOLD, FULL ONE YEAR WARRANTY Z-80 CPM MICROSOFT SOFTCARD EMULATOR, RUN WORDSTAR, MAILMERGE, D-BASE AND OTHER Z-80 CPM BASED SOFTWARE, SPECIAL ONLY $39.00
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JOYSTICK IIE, IIC, (9 PIN) TO II, II+ (16 PIN) CONVERT CABLE $9.00

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SURGE PROTECTED COOLING FAN, QUIET, EFFICIENT, JUST CLIPS ON SIDE OF APPLE II, II+ & IIE COMPUTER, U.L. LISTED COMPONENTS. LIGHTED FRONT POWER SWITCH, DUAL AUXILIARY OUTLETS, POWER CORD **$24.99**



NEW APPLE IIC SERIAL TO PARALLEL BOX

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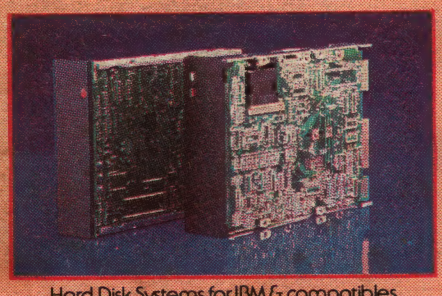
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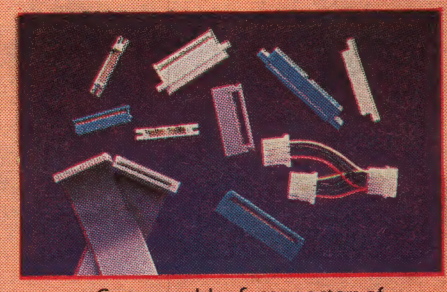
11. **Model# DH8-**for 2 full size 8 inch drives **$295.**

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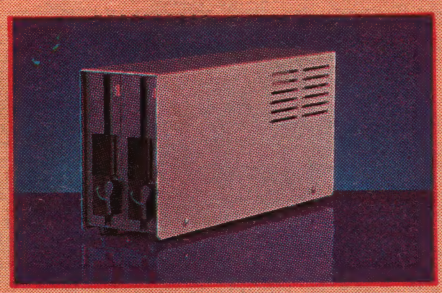


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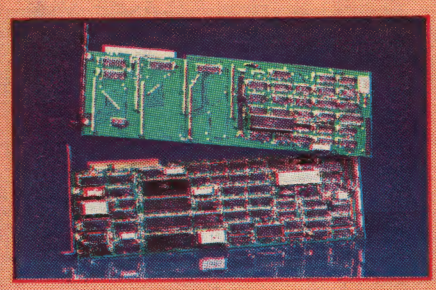


Custom cables & connectors of all types

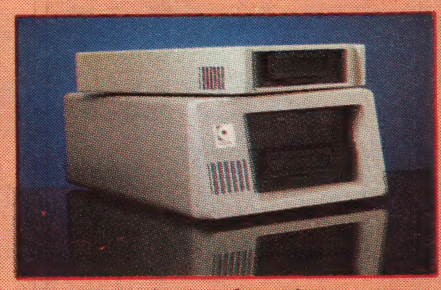


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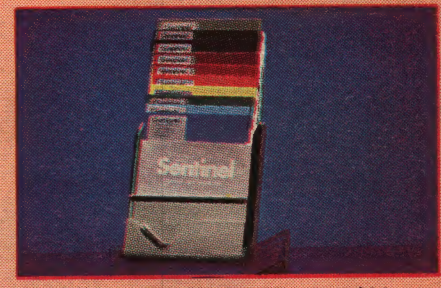
SALE: FDD-200-8, DS/DD 8" $185. each



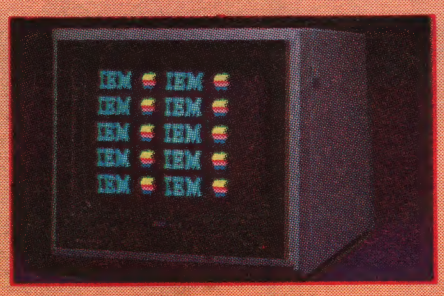
IBM and compatible boards of all types



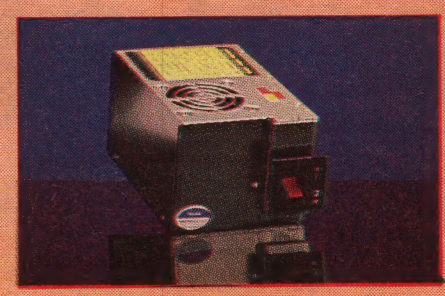
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